

## GH 301 – Health Analytics Management

Nov 2025/Mar 2026/Jul 2026

This Course Strategy Guide provides an overview of GH 301 – Health Analytics and Management. It is intended to help the candidate understand the objectives of this course and to provide a guide for how to prepare for the course assessment. Please note that while this Guide can be a valuable aid in preparation, the material in this Guide will not be tested.

### **I. Purpose of this Course**

The Group and Health (GH) practice area covers both group benefits and health-related benefits. The products include group and individual medical, dental, vision, prescription drug, retiree health, group life, group disability income, group LTD, LTC, and critical illness.

There can be significant overlap with other practice areas and candidates should be mindful of the variety of types of benefits that group and health actuaries may encounter in their careers.

This course, GH 301, addresses topics that group and health actuaries frequently encounter in more depth beyond what is covered in the group and health course sequence (GH 101 – Benefits and Pricing and GH 201 – Valuation and Regulation). These topics include the development and management of provider networks and reimbursement structures, techniques for disease management, and the application of healthcare risk adjustment models. The course also introduces medical terminology, analytic use of medical data, and predictive analytics for healthcare actuaries. These last two topics are presented in a module format in which the student will be guided through the material in an on-line platform.

This course does not directly assess material learned in the GH 101 and GH 201 courses, although we anticipate that those taking this course will be familiar with terminology and approaches covered there. The first course, GH 101, focuses on the design of common types of insurance contracts, the rating of those contracts, underwriting and funding risks, and the overall structure of employee benefit plans. The course focuses on short duration contracts since the majority of group and health actuaries focus primarily on short duration contracts.

The second course, GH 201, focuses on the valuation of insurance liabilities. This includes reserving for both claim and non-claim liabilities and understanding of financial reporting concepts. The course also covers nation-specific regulations and government programs that impact the design and management of group and health contracts.

A fourth course, CP 321 – Disability, Long-Term Care, and Long-Duration Health Contracts, covers long-duration contracts including long-term care, disability income, retiree medical, and certain supplemental medical coverages. It is labeled “CP” because it has applications to not

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only group and health actuaries, but to life, pension, and other actuaries. The course emphasizes techniques involved in pricing and valuation of these long-duration contracts.

## **II. Recommended Approach in Preparing for the Course Assessment**

The recommended study approach is to first read the complete Course Strategy Guide. Then read the descriptions of the Learning Objectives and the Learning Outcomes to get an overview of what you are expected to learn as you work through the syllabus. Then watch the videos from the links in the syllabus under Topic 1. Finally, read the syllabus study materials in the order described in this document.

The preferred study style will vary for each candidate; but it will be helpful to read through the whole syllabus (and perhaps take notes) prior to focusing on summarizations of the material and prior to working practice problems. The topics are related and observing the broader perspective will help you understand the material as a whole and help you spot connections between the syllabus items. **Yellow** highlighting in this Guide indicates items where candidates should spend more time after the initial read-through of the course material to ensure they master the key concepts and calculations presented in these items.

## **III. Exam Syllabus Learning Objectives and Learning Outcomes**

This course builds on the GH 101 and GH 201 courses and takes a deeper look at topics that are important for health actuaries to understand – and which are increasing in visibility as healthcare becomes more complex. The course covers three topics in depth: medical provider contracting and reimbursement approaches; the design and financial evaluation of disease management programs; and the objectives of healthcare risk adjustment. Candidates will also study medical data and coding terminology and structures and how predictive analytics may be applied to healthcare data in an eLearning module structure. The impact of social determinants of health and use in actuarial practice is also discussed.

Six topics are covered in this course:

1. Provider Contracting and Reimbursement;
2. Disease Management;
3. Healthcare Risk Adjustment;
4. Medical Data;
5. Social Determinants of Health;
6. Predictive Analytics

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Details of the learning objectives, learning outcomes, and study materials associated with the learning outcomes are provided in the course syllabus. The syllabus also notes the learning outcomes supported by each reading. You should focus on the learning outcomes as you review each topic. In addition, this Guide provides additional context on the purpose and interrelationships of the readings. The topic titles in the syllabus indicate the approximate portion of exam points selected from each topic.

**Topic 1 - Provider Contracting and Reimbursement: The candidate will understand how to evaluate the effectiveness of provider reimbursement methods from both a cost and quality viewpoint.**

This topic introduces the candidate to provider contracting and reimbursement arrangements. Most medical insurance products utilize networks of providers (e.g., doctors, hospitals, pharmacies). The plan sponsor wants to balance network competitiveness with cost efficiency. Various approaches have been utilized over time – and each entails trade-offs for the member, plan sponsor, and provider.

First read,

- GH301-105-25: Chapter 45 of *Group Insurance*, Skwire, Daniel, 8<sup>th</sup> Edition, 2021

This chapter is included in the package of study notes since the Group Insurance text is not used extensively on this course. It is the same text used extensively in the GH 101 and 201 courses. This chapter introduces the plan sponsor's key objectives when developing and reviewing provider networks.

Second read,

- Provider Payment Arrangements, Provider Risk, and Their Relationship with Cost of Healthcare, 2015 (excluding Appendices)

The Milliman report provides an extensive overview of provider reimbursement approaches and the risks of each to various stakeholders.

Third read in order,

- Value-Based Care Framework, The Actuary, April 2020
- The Cost of Value-Based Care, The Actuary, April 2020

Value-based care has been a hot topic in recent years. The objective of value-based care is to better align provider incentives to maximize revenue with plan sponsor incentives to minimize cost. There are a number of approaches that can be utilized – but each intends to incent

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providers to deliver the right level of care at the right time to the right member. The articles above provide an introduction to value-based care.

Fourth read,

- GH301-100-25: Evaluating Bundled Payment Contracting

This reading provides additional detail on the concept of bundled payments.

Fifth read in the order listed below,

- Healthcare Risk Adjustment and Predictive Modeling, Duncan, Ian G., 2<sup>nd</sup> Edition, 2018
  - Ch. 22: Accountable Care Organizations
- GH301-101-25: Avoiding Unintended Consequences in ACO Payment Model

These readings introduce accountable care organizations and approaches that have been tried to calculate and share cost variances from a target level. Chapter 22 has some substantial calculation examples in it. In your first pass through the syllabus, you should skim the study note. You will need to dedicate time as you continue to study to fully understand the math and be able to explain and replicate these calculations in an assessment environment.

Sixth read the following articles in no particular order,

- GH301-102-25: Episode-Based Physician Profiling: A Guide to the Perplexing
- GH301-103-25: Physician Cost Profiling – Reliability and Risk of Misclassification
- GH301-104-25: The Application of Tiering in Healthcare
- Surprises in the No Surprises Act: An Interview with Greg Fann, Parts 1 and 2, Health Watch Sep/Nov 2024

These articles are intended to provide examples of applications of provider contracting techniques. The study notes present the topics of physician profiling/tiering and how a tiered cost sharing structure could work. The Health Watch articles discuss reimbursement for care provided by non-contracted providers and the challenges to the member and the plan sponsor.

**Topic 2 – Disease Management: The candidate will understand how to evaluate healthcare intervention programs.**

Plan sponsors use a variety of techniques to understand the relative cost, efficiency, and quality of care. These techniques may include changes in clinical guidelines, counselling provided to patients or providers, or use of different care pathways. The readings in this section discuss ways to evaluate the effectiveness of these disease management programs and to estimate the costs avoided by each program.

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First read in order,

- Managing and Evaluating Healthcare Intervention Programs, Duncan, Ian G., 2<sup>nd</sup> Edition, 2014
  - Ch. 3: Care Management Programs and Interventions
  - Ch. 8: Understanding the Economics of Care Management Programs
  - Ch. 9: Applying the Economic Model: The Example of Opportunity Analysis
  - Ch. 11: The Use of Propensity Scoring in Program Evaluation
  - Ch. 12: An Actuarial Method for Evaluating Care Management Outcomes (excluding Appendix 12.2-12.3)
  - Ch. 13: Understanding Patient Risk and Its Impact on Chronic and Non-Chronic Member Trends
  - Ch. 16: Testing Actuarial Methods for Evaluating Disease Management Savings Outcomes (excluding Appendices)

Much of the content on this topic is taken from *Managing and Evaluating Healthcare Intervention Programs* by Ian Duncan. The author will occasionally reference items in prior chapters in later chapters, so it is best to read in order. Portions of Chapter 4 (Actuarial Issues in Care Management Evaluations) and 10 (Measuring Care Management Savings Outcomes) of this textbook will be read in Topic 4 Medical Data. Those chapters include a description and analysis of the pros and cons of types of study methods (e.g., pre/post cohort, participant as own control, random trial). There will be references to types of study methods within this material. It is recommended you skim within this topic, study in detail in medical data, and then return here to synthesize the information. The chapters highlighted in yellow have more mathematical examples that will require additional study to be able to replicate in an assessment environment but are not very difficult to comprehend.

Second read in any order,

- GH301-106-25: End-of-Life Outcomes with or without Early Palliative Care: A Propensity Score Matched, Population-Base Cancer Cohort Study
- Valuation of Care Management Vendors, Health Watch May 2020

These articles provide examples of how disease management programs can be evaluated in practice. “End-of-Life Outcomes with or without Early Palliative Care” is an example of propensity scoring first presented in Chapter 11. The Health Watch article is a high-level summary of how the evaluation of a program might happen in a health plan.

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#### **Topic 3 – Healthcare Risk Adjustment: The candidate will understand how to apply risk adjustment in actuarial work.**

Traditional commercial medical products in the US were medically underwritten – with resulting coverage and rates adjusted to reflect the insured population’s expected claims cost. Certain markets, however, constrain the variables that can be used in setting premium rates. We recommend reading the material by topic: Medicaid, then Medicare, then ACA. Throughout this material there are numerous math examples. Understanding the math is inherent to understanding risk adjustment. You should try to understand and interpret on your first pass and then come back on a second pass and work through examples to be able to replicate in an assessment environment.

First read in order,

- Healthcare Risk Adjustment and Predictive Modeling, Duncan, Ian G., 2<sup>nd</sup> Edition, 2018
  - Ch 13: Medicaid Risk Adjustment
- Risk Adjustment in State Medicaid Programs, Health Watch Jan 2008

Medicaid managed care plans receive a capitation rate from the government to provide services. The capitation rate is adjusted based on the cost profile of the actual enrolled membership. The textbook chapter provides a comprehensive summary of Medicaid risk adjustment. Although the Health Watch article is older, it is still valid and supplements the textbook material with a focus on how risk adjustment is applied.

Second read,

- Healthcare Risk Adjustment and Predictive Modeling, Duncan, Ian G., 2<sup>nd</sup> Edition, 2018
  - Ch 14: Risk Adjustment in Medicare (excl Appendices 14.1 and 14.2)

Medicare Advantage products are community rated – meaning all insured members pay the same premium for a specific product, regardless of the individual’s age, gender, or health status. Risk adjustment applies to the capitation rates paid by the government; these amounts are adjusted to account for each member’s age, gender, and medical diagnoses. Chapter 14 provides an overview of Medicare risk adjustment and some simple examples.

Third read in order,

- Healthcare Risk Adjustment and Predictive Modeling, Duncan, Ian G., 2<sup>nd</sup> Edition, 2018
  - Ch 21: Risk Adjustment on the ACA Exchanges
- Creating Stability in Unstable Times – A Look at Risk Adjustment and Market Stabilization, The Actuary, Dec 2017

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- Changing with the Times: The Past and the Future of ACA Risk Adjustment, Health Watch, June 2020
- GH301-107-25: HHS Operated Risk Adjustment Technical Paper on Possible Model Changes, Oct 2021 (Ch 1, 5, Appendix A)
- Restoring the Indifference Ideal: If It's Not Adjusting for "Risk," It's Not "Risk Adjustment", Health Watch, Jun 2022

Insurers in ACA markets, both individual and small group, are constrained in how premiums can vary. Risk adjustment for these markets is intended to fill the "gap" between the modified community rates that can be charged and the anticipated claims cost which fully reflects the member's age, gender, medical conditions, and level of insurance coverage. The four actuarial articles and the HHS technical paper explore the evolution of risk adjustment over time, including the challenges and complexities that have been encountered when applying these approaches.

Fourth read,

- ASOP 23: Data Quality
- ASOP 41: Actuarial Communications
- ASOP 45: The Use of Health Status Based Risk Adjustment Methodologies

Topic 3 concludes with the applicable Actuarial Standards of Practice (ASOPs). These are included to highlight the considerations and critical analyses actuaries are expected to bring to the profession. While the ASOPs may be specific to actuarial practice in the United States, actuaries world-wide are expected to bring similar levels of professionalism, rigor, and critical thinking to the work they undertake. Similar standards of practice exist in other countries and would emphasize similar practices and considerations as the ASOPs.

ASOP 23 and 41 are included here and may be used for questions on any part of the assessment in relation to any syllabus material. Group and health actuaries need to always consider data quality and communications in their work. ASOP 45 relates to topics presented here and may be examined in conjunction with the underlying material to which it applies.

**Topic 4 – Medical Data: The candidate will understand how to describe medical coding, sources of data, and data quality.**

Actuaries leverage large quantities of data to develop projections, models, and assess how results are emerging in practice. There also are many situations where a health actuary will need to price a new benefit or service for which the insurer does not have historical claims experience.

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An eLearning module serves as the content for this section of the course. Candidates should read the module and referenced source material. Most references are intended to provide an example of how to identify data sources, evaluate the quality and reliability of the source, and make any necessary adjustments when using the source for other actuarial purposes. Throughout this module, you will be directed to multiple external sources. In general, it is not expected that you memorize the information in these sources. However, you should be familiar with how to use these or similar sources to answer questions in an assessment setting. The module notes whether or not each document is testable.

#### **Topic 5 – Social Determinants of Health: The candidate will understand how to explain the social determinants of health (SDOH) and their impact on health care costs and policy.**

In recent years the importance of the broader determinants of health beyond simple medical care access and quality have become more prominent. Actuaries are being asked to consider these additional variables in traditional actuarial practice. This topic examines how socioeconomic and behavioral characteristics may impact cost projections and financial modelling.

The material will be presented in an integrated manner with GH301-108-25: “Social Determinants of Health in the Work of Health Actuaries” providing context and guiding the candidate to read specific sections of the supplemental sources. The supplemental material includes sections of two SOA research papers, a health in housing study example, and two papers on the use of SDOH and other variables in the Massachusetts Medicaid risk adjustment model. Candidates should review the examples provided in this section with an eye towards understanding how environmental and social factors may impact actuarial work.

#### **Topic 6 – Predictive Analytics: The candidate will understand how to apply the framework of predictive analytics to healthcare data and business applications.**

Predictive analytics can be a useful tool when conducting actuarial work. An eLearning module covers this topic. Candidates should review the module and referenced source material. Most references are intended to provide examples of how predictive analytics may be used by a health actuary, how the results may be interpreted, and shortcomings the actuary should keep in mind when using the results, especially if the results are to be used for a purpose that is not exactly the same as the purpose for which the model was developed. Throughout this module, you will be directed to multiple external sources. In general, it is not expected that you memorize the information in these sources. However, you should be familiar with how to use these or similar sources to answer questions in an assessment setting. The module notes whether or not each document is testable.



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#### **IV. Guidance for Assessment**

In general, questions on the course assessment will consider a scenario or project that health actuaries may encounter. The questions will have multiple parts; it is common for early parts to be relatively straight-forward and help develop the context for latter parts. Latter parts of questions frequently require the candidate to perform an analysis or make a recommendation given a particular business context. Note that a solution to a problem presented within the study materials is appropriate for the context used within those study materials but may not be appropriate for the context of the assessment. Since the assessment is focused on the demonstration of critical thinking, the candidate must learn how to take the learnings from one situation and apply them to a different situation. Candidates are expected to apply the techniques and insights that they learn from the syllabus study materials to new real-world problems. The candidate uses the study material as a tool to gain insights about the learning objectives and learning outcomes. These insights as expressed in a solution to tasks that require the demonstration of critical thinking.

The supplemental materials for this course include guided examples and past exam problems that have examined similar topics. The candidate is wise to review these questions and treat them as examples of the types of questions that will appear on the course assessment.

It also is important to note that in practice, actuarial problems typically have a level of uncertainty. As such, there may not be a single correct answer to the questions posed by the assessment. In these cases, the work and assumptions that candidates provide to illustrate their reasoning is at least as important as the final answer or recommendation provided to the question.