EXPOSURE DRAFT: A PUBLIC POLICY PRACTICE NOTE

Long-Term Care Insurance

January 2019

Developed by the Long-Term Care Practice Note Work Group of the Health Practice Council of the American Academy of Actuaries

The American Academy of Actuaries is a 19,500+ member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

Long-Term Care Insurance Practice Note Work Group

Jennifer Caplin
Chair
Warren Jones
Vice-chair

Rhonda Ahrens
Peter Da Silva
Tricia Dave
Christopher Giese
David Hippen
Matthew Klaus
Shawna Meyer
Shawn Parks
Jeremy Williams
D. Joeff Williams

The Work Group gratefully acknowledges the contributions of William Weller.

The comment deadline for this exposure draft is April 30, 2019. Please send any comments to health@actuary.org.

Long-Term Care Insurance Practice Note

INTRODUCTION

The purpose of this practice note is to provide a source of information to practicing long-term care (LTC) actuaries seeking to better understand the considerations in evaluating experience, setting assumptions, valuation, and financial reporting.

This practice note was prepared by a work group organized by the Health Practice Council of the American Academy of Actuaries (Academy). The work group was charged with updating the 1995 long-term care insurance practice note.

This practice note is not a promulgation of the Actuarial Standards Board, is not an actuarial standard of practice, is not binding upon any actuary and is not a definitive statement as to what constitutes generally accepted practice in the area under discussion. Events occurring subsequent to this publication of the practice note may make the practices described in this practice note irrelevant or obsolete.

The practice note represents a description of practices believed by the work group to be commonly employed by actuaries in the United States. The purpose of the practice note is to assist actuaries who perform actuarial work related to long-term care insurance. In addition, references have been made to other relevant and readily available literature. However, no representation of completeness is made, nor is there an assertion as to whether the practices discussed herein constitute best practice; other approaches may also be in common use.

This practice note has been divided into two sections:

Section A: Experience Studies and Assumption Setting

Section B: Financial Reporting and Valuation

Section A: Experience Studies and Assumption Setting

Morbidity

Q1. What morbidity approaches are regularly utilized?

There is a spectrum of approaches for modeling morbidity. The two common approaches that are regularly utilized include: (1) the use of pre-stored claim costs and (2) the use of a first-principles modeling approach where all calculations are performed "on-the-fly." The more commonly utilized approach is where claim costs are applied to all lives, off-claim (also referred to as active or healthy) and disabled, while first-principles approaches typically distinguish between off-claim and disabled lives when modeling future morbidity. When developing assumptions for the model, it is important to understand the exposure basis anticipated by the model methodology. For example, the actuary needs to understand whether the exposure basis is off-claim versus disabled lives, or all lives, and whether or not an exposure adjustment is needed.

Claim cost models are intended to reflect all aspects of morbidity in one set of values, reflecting the average expectation of future morbidity. These models are different than first-principles models where each component of morbidity (e.g., incidence, continuance, utilization, etc.) is calculated and projected separately.

a. First principles—incidence and termination rates

A first-principles model in the context of LTC typically refers to the approach where future morbidity is modeled on-the-fly using specified assumptions rather than utilizing stored claim cost factors. However, some actuaries use this term to refer only to some aspects of this modeling approach and not necessarily to all aspects. Actuaries may refer to varying levels of granularity as a first-principles approach. For example, some may refer to an approach based on the use of an incidence rate multiplied by a severity calculation as a first-principles approach while others would consider this as a hybrid between a first-principles approach and a claim cost approach.

There are two approaches in modeling on a first-principles basis:

1. Off-claim versus Disabled Lives: This approach utilizes assumptions specific to off-claim (active and not currently on-claim) lives and disabled (those currently on-claim) lives.

2. All Lives: Less commonly used, this approach utilizes assumptions based on all lives and does not differentiate assumptions based on the claim status of the insured.

A first-principles model generally does not rely on bundled claim costs for morbidity assumptions, but rather separate assumptions are typically input for incidence, off-claim life mortality, disabled life mortality, recoveries, and benefit utilization. More complex models may distinguish care settings. The model typically projects expected cash flows on the two separate populations (off-claim lives and disabled lives) and applies different decrements to the separate populations. Benefit exhaustion is commonly modeled explicitly based upon

benefits utilized so that a separate assumption for benefit exhaustion is not required. The model would most likely also project the interaction of the two populations. Incidence rates are generally utilized to reflect a transition from the off-claim life pool to the disabled life pool, whereas recovery rates are often utilized to reflect a transition from the disabled life pool to the off-claim life pool.

There are several reasons that actuaries may choose to utilize a first-principles modeling approach:

- Improved understanding of a carrier's business, which will then allow for a more effective management of the business;
- Greater level of precision in the calculations;
- Ability to analyze and vary assumptions when experience deviates;
- More precision in ALM analysis; or
- Enhanced ability to identify principles based economic capital.

There are also several disadvantages of a first-principles modeling approach:

- Separate assumptions required for off-claim and disabled lives;
- Greater complexity of the model; or
- Current carrier actuarial software may not have the capability for first principles modeling.

b. Claim Costs—in force vs. disabled lives

The claim-cost approach has historically been the common approach utilized for projecting LTC morbidity, consistent with methods utilized for other health products. As first-principles approaches have become more popular, claim costs have been utilized less to measure morbidity for LTC insurance. Claim costs represent the total annualized incurred claims per unit of exposure. The factors are often applied on a total lives basis, including both off-claim and disabled policyholders. In some cases, the factors are applied only to active (i.e. off-claim) lives. The actuary will want to understand how the claim cost assumptions were derived in order to use them accordingly. For example, if the claim costs were developed based on an active lives exposure basis, an exposure adjustment (sometimes referred to as J-prime adjustment) would be applied to a total lives exposure model to avoid overstating the morbidity.

There are several reasons that actuaries have chosen to utilize claim costs historically:

- Complexity—with only one set of assumptions regarding expected morbidity, some actuaries may find it easier to understand and review for reasonableness. Due to the complexity inherent in the first-principles approach, the moving pieces are sometimes more difficult to comprehend and can create additional analysis requirements that might not be warranted for smaller or less complex blocks of business.

- Ease of Implementation—claim costs are often easier to implement as most actuarial software include claim-cost approaches. Most in-house tools and some software providers do not currently support robust first-principles methodologies.

- Credibility—depending on the experience available, a first-principles approach can create credibility issues in cells with sparse data. For further considerations regarding credibility, refer to the *Long-Term Care Credibility Monograph*.[1]

There may be drawbacks to a claim-cost approach that the actuary may want to consider:

- Lack of Flexibility—claim costs are based on a predetermined set of interest discount assumptions that cannot be altered without recreating the claim costs.

- Lack of Transparency—claim costs provide less transparency than a first-principles approach where attribution analysis of the various morbidity impacts can be performed and analyzed. Claim costs can mask trends, because experience in one attribute (e.g., incidence) can be overshadowed by changes in other attributes (e.g., continuance and utilization).

- Lack of Precision—a first-principles approach allows for a greater level of precision in the calculations. Because each morbidity attribute is developed and modeled separately, the intricacies and inter-relationships of those attributes can more precisely be modeled. Claim-cost models do not explicitly reflect changes in morbidity assumptions in the projected exposed lives. Claim costs are developed assuming an average expectation of morbidity. Therefore, claim costs are less reactive to changes in underlying morbidity attributes.

Consideration of the block's particular circumstances is important in determining which particular approach might be the best to utilize. These circumstances would include, but are not limited to, the size and complexity of the block, system capabilities, available time and resources, and level and quality of data available.

Q2. What level of granularity should be used in setting the assumptions?

The actuary often will consider those assumptions that could have a significant impact on the results. There is a wide range of practice for the level of granularity of assumptions. The granularity of assumptions is an area of judgment and will depend on a number of factors such as:

- Credibility of the block
- Availability and quality of company data
- Availability of industry experience
- Product features
- Type of assumption (incidence, utilization, claim termination)

[1] Available at http://actuary.org/files/imce/LTC_Credibility_Monograph_08172016.pdf.

- Time and resources available

Examples of the variations in morbidity assumptions include, but are not limited to: gender, policy form, inflation type, site of care, marital status, home health care benefits, geography, claim adjudication practices, benefit period, elimination period, level of underwriting, policy duration, issue age, attained age, benefit triggers, and benefit payment method (indemnity, reimbursement, cash).

Q3. What practices are in place regarding morbidity and mortality improvement?

The practices in place for mortality and morbidity improvement include the following:

- Assume both a morbidity and a mortality improvement
- Assume neither a morbidity or a mortality improvement
- Assume only mortality improvement
- Assume only morbidity improvement

The more common practices include incorporating neither or both morbidity trends and mortality trends. For those actuaries who do assume improvement, the assumed period of time varies in practice from a relatively short period of time such as 10 years to a longer period such as 30 years. Typically, the improvement is a flat rate. Morbidity improvement scales that vary by age are uncommon.

The actuary may consider the support for any assumption made in regard to improvement, as this is an area with significant judgment that can create a high level of sensitivity to the results. The actuary often will consider the implications of making or not making mortality and morbidity improvement assumptions. Absent disabled-life mortality improvement, future length of stay is the same as today. Including morbidity improvement lowers the future incidence rates. The actuary may consider if these trends have been observed. The actuary often will consider the purpose for which the assumption is being used. For example, statutory reserving practices do not typically assume morbidity improvement (and some states specifically do not allow it). Morbidity improvement assumptions are more common in long-term projections such as loss recognition and asset adequacy testing.

Q4. What experience studies may be performed?

The types of studies that the actuary may consider from a morbidity perspective include the following:

- Incidence study, which estimates the probability that an active policyholder will go to on claim.

- Continuance / claim termination study, which estimates the probability that a claimant will continue to be disabled and remain on claim (note that claim termination rates equal one minus the continuance rates). Claim termination studies may also separately break out claim termination rates between recovery rates and disabled mortality. Additionally, another

practice could be to develop total claim termination rates and disabled mortality rates, and then back into recovery rates.

- Transfer study, which estimates the probability that an insured will move to a different site of care. For example, the study could measure the probability that a home health care claimant could move to a nursing home facility.

- Utilization / salvage study, which estimates the portion of the maximum benefit being claimed—often reflected in both dollars and days. For example, a policyholder with a $100 daily maximum benefit who is receiving $80 per day in home health care benefits would have an 80% utilization rate or 20% salvage rate. An individual receiving benefits for three days per week and using the full daily maximum would have a utilization rate of 3/7, or 43%.

- Another consideration in utilization is whether there is a link or correlation between the LTC benefit utilization and external economic indexes like the CPI or interest rates. Some companies include such a link in both their experience studies and future claim projections.

- Claim cost study, which estimates the total annualized incurred claims per unit of exposure. This approach is often utilized when first-principles models are not in place.

Key considerations in performing the experience studies include but are not limited to an evaluation of the following:

- Attained age vs. durational influences
- Impact of underwriting selection and developing an understanding of how quickly, and when if ever, the impact of underwriting fully wears off
- Granularity of assumptions
- Normalizing for the large number of variables that influence claims
- Off-claim lives versus total lives
- Impact of rate increases on morbidity experience (i.e., potential for anti-selection; changes in utilization when benefit maximums are reduced)
- Credibility of data

Q5. How often may the actuary perform experience studies?

Studies are often performed as frequently as is needed to detect material changes in the underlying experience and future expectations. It is common practice for larger, more material blocks to perform studies at least annually. However, for less material blocks, actuaries sometimes perform these studies less frequently. There are many considerations in deciding how often to perform a study:

- Regulatory/audit requirements
- Time requirement to complete
- Materiality and the size of the block
- Stability of block

- Amount and cost of data available and how fast it is emerging
- Characteristics of blocks; with a very young block, studies may not be performed as frequently in initial years while experience is still immature
- Timing of industry studies and data availability (when credibility is not 100% and relying on other company data)

Q6. What data sources are utilized for the studies/sources of industry studies?

The data sources that the actuary might consider include, but are not limited to, the following:

- Company experience
- Industry sources such as SOA intercompany experience studies
- Government sources to the extent available
- Pooled company information
- Consultant data sources
- University studies

ASOP No. 18, *Long-Term Care Insurance*, indicates the order that should be used if data is credible. Morbidity Assumptions, section 3.2.1, has the following order: company, industry, population:

"Specific data from the entity to which the actuary's calculations apply generally are preferable to data from other sources. Where such data are not adequately credible, industry data should be considered next in setting assumptions. As a last but sometimes necessary source, general population noninsured data may be utilized."

Persistency

Q7. What are the decrements commonly used to project expected persistency?

The decrements commonly used include mortality and voluntary lapse. Separate benefit exhaustion rates may also be used in some models. Similar to morbidity assumptions, the actuary might consider the type of model being utilized (first principles versus claim cost and confirm consistency between the assumption development and the way the assumptions are actually used in the projection models).

Q8. What are the sources and variations possibly considered for mortality?

The sources of insured industry mortality tables include published or industry tables (typically developed on all-lives basis). Many actuaries use annuitant tables given similar persistency risk. Commonly published tables include, but are not limited to, the 1994 GAM, A2000, and 2012 IAM.

Company data should be utilized to the extent credible, according to the guidance in ASOP No. 18. Depending on the size of the block and quality of the data, the actuary sometimes relies

completely on company data or apply experience adjustments to a published table after comparing actual experience to the published table.

The actuary will often consider the level of under-reporting of deaths when relying on company or industry data (refer to Q13 for more details).

Additionally, the actuary should be aware of prescribed mortality tables in order to comply with regulatory or accounting standards.

Some of the key variations that actuaries often consider for mortality assumptions include the following:

- Attained age
- Gender
- Off-claim and disabled
- Underwriting and selection factors (implies policy duration)
- Risk class
- Marital status
- Correlation with morbidity experience
- Calendar year changes (such as mortality improvement)—incorporating calendar year trend or improvement
- Anti-selection impacts, particularly following rate increases

Q9. What are the sources and variations to consider for lapse?

The sources to consider for lapse assumptions include published or industry intercompany studies. Company data will often be utilized to the extent credible. Depending on the size of the block and quality of the data, the actuary may be able to rely completely on company data or alternatively on intercompany studies.

The actuary should also consider prescribed minimum standards for setting lapse assumptions for statutory reserving.

Some of the key variations actuaries consider for lapse assumptions include the following examples:

- Duration
- Issue age
- Marital status
- Inflation protection
- Attained age
- Risk class
- Market distribution for multi-life products—for a group or multi-life product, lapse rates can vary depending on whether the premium is employer paid vs employee paid; portability and industry turnover could be considered

- Riders (such as return of premium)
- Coverage richness
- Calendar year changes (such as rate increase impacts—shock lapse)
- Consider product features/offerings
    - Premium paying years—as approaches paid-up year lapses will tend to decrease and then zero thereafter; no lapse rates on single premium policies
    - Treatment of policy changes (such as downgrades associated with a rate increase)

Q10. What are the sources and variations that actuaries consider for benefit exhaustion?

Benefit exhaustion assumptions are typically used in a claim-cost model and are a function of the morbidity and policy persistency assumptions. Benefit exhaustion assumptions are not typically utilized in first-principles model because it is usually modeled explicitly based on benefits used so that a separate assumption for benefit exhaustion is not required.

Benefit exhaustion rates are separately derived using morbidity, mortality, and lapse assumptions. The slope of the benefit exhaustion assumption is typically different than the slope of the other policy persistency assumptions. If modeling under a claim-cost approach and using an all-lives model, then decrements may need to be adjusted to ensure that the model is consistent with the assumption development.

Some of the key variations to consider for benefit exhaustion assumptions include:

- Product benefits (i.e., benefit period)
- Product features (such as restoration of benefits)
- All other claim-cost variation considerations

Q11. What practices exist for mortality improvement assumptions?

Actuaries consider existing studies on supporting historical improvements in general population mortality. Examples of influences driving mortality improvement cited include medical advancement, improved work conditions, public health initiatives, individual lifestyle changes, and increases in income/education. There are studies supporting the use of mortality improvement for both off-claim and on-claim lives (e.g., SOA MP-2014). The actuary often will model as appropriate how future changes in mortality might impact LTC projections for an insured population. Areas of consideration are outlined below:

- Population "Segment"

  Mortality assumptions for LTC projections as summarized above can generally be categorized into two broad segments: death rates for "off-claim" individuals and death rates for "disabled" individuals on claim. These two groups together form a "total" mortality assumption. The actuary often will consider how the influences driving mortality improvement affect each of these segments, and as applicable, how the improvement patterns translate to a total mortality impact for projection purposes.

Caution may also be used when interpreting improvements observed in the general population or other insured populations for use in projecting LTC insured mortality. The factors driving mortality improvements in other populations often will be reviewed to determine their appropriateness specific to a LTC block of business. For example, if a research study points to changes in income/education as driving mortality improvement, the actuary may want to consider whether those influences are relevant for an insured LTC population often comprised of individuals with higher income/education levels.

- Choice of Base Year

  A reference year or period will form a "base" point for a starting mortality assumption—i.e., a mortality study or existing industry mortality table will represent expected mortality at a given point in time. The actuary will need to consider how to model future improvements from the base table. Some approaches to model future improvements include the following:

  - Model mortality improvement from historical base point up to valuation date
  - Model mortality improvement from historical point up to valuation date and continue into future projection
  - Model improvement from valuation date into future projection

- Choice of Amount and Years of Improvement

  Similar to morbidity, practices vary on incorporating mortality improvement into projections. The actuary often will consider the support for any assumption made in regard to improvement as this is an area with significant judgment, and there can be a high level of sensitivity to the results.

  The actuary often will take into consideration the purpose of the projection and relevant regulatory and accounting rules when deciding on a mortality improvement assumption. Some current practices and considerations include, but are not limited to, the following:

  - Project anticipated improvements indefinitely or for a set number of years (such as 10 or 15 years)
  - Use a fixed annual percentage each year or vary the improvement factor by projection year
  - Vary the mortality improvement assumption by population segment (as described in prior section)
  - Use mortality improvement scales published by the Society of Actuaries (such as mortality improvement Scale AA or Scale BB)
  - "Link" mortality improvement assumption to morbidity improvement assumption in terms of the level of annual improvement and / or the number of future years of improvement

- This practice implicitly assumes the drivers of morbidity improvement have a correlated impact on mortality.

- For example, if the morbidity improvement assumption is 1% annually for 10 years, an actuary using a "1 to 1" match for years and "0.5 to 1" match for the level might assume a mortality improvement assumption of 0.5% annually for 10 years. These numbers are illustrative and not intended to be a recommendation.

Q12. What are the considerations in constructing policy persistency assumptions?

When constructing assumptions for policy persistency, it is important to analyze, understand, and project the contributing influence of each decrement on termination rates. Each decrement will exhibit different levels and trends over time. For example:

- Mortality: death rates start lower and increase with age
- Voluntary lapse: rates start higher in early policy duration, then decrease and generally level off
- Benefit exhaustion: generally start low and increase as claims increase for non-lifetime coverage

Policy persistency assumptions often are constructed to reflect the evolving patterns of each decrement and account for factors that may influence those patterns, such as the age, duration of the business, rate increase, and trends. The actuary might reflect how the mix of off-claim and disabled policyholders impact the decrements.

Although it is important to understand the level and patterns associated with each individual decrement, careful consideration needs to be given to the projection of total terminations. Policy persistency assumptions must be set and applied to produce estimated total terminations that properly account for the combined impacts of all decrements.

Q13. What are the considerations in performing persistency experience studies?

Outlined below are areas of consideration when developing persistency assumptions from experience studies. The items are intended to be common practices and not an exhaustive list. The actuary will often consider material influences on termination rates specific to the products being analyzed.

- Classification of Terminations

  - LTC mortality data is susceptible to under-reporting given most policy designs lack incentives for reporting a death.

  - Actuaries could consider expanding coded historical deaths by matching all terminations with supplemental datasets that record individual deaths, such as the Social Security Death Master File and state specific information.

- It also may be beneficial to review further the termination reason for individuals close to exhausting benefits for classifying a termination as a death or benefit expiry.

- Study Decrements Separately or Use "Back-out" Approach

  - The actuary could consider whether each decrement can be analyzed separately or use an approach that starts with total terminations and subtracts out one or more other decrements using expected assumptions to isolate a given decrement.

  - Regardless of study approach, the final model assumptions often will be tested by examining the historical fit and projection for the combination of all decrements (i.e., total terminations).

- Exposure measurement for identifying decrement rates

  - Some will measure mortality or lapses using the exposure at the beginning of the period being studied (such as the beginning of a month or year).

  - Some will measure mortality or lapses using an estimate of exact exposure.

  - A common approach is to use exposure at the beginning of the period for the decrement being studied and an estimate of exact exposure for the decrements that are not being studied. For example, if an actuary is measuring lapses, the counts at the beginning of the period are used while policyholders that were known to have died during that period will contribute on average half a period of exposure.

- Impact of Rate Increases

  - For blocks that have implemented a rate increase, experience often will be measured and studied considering the potential influence of rate increases on termination rates, such as a change in voluntary lapse (i.e., shock lapses).

  - Some approaches to study the influence of rate increases include examining patterns by calendar year, evaluating experience by state, and marking terminations occurring near an implemented rate increase for additional analysis.

  - The experience study could also consider an individual's ability to convert to paid-up status or reduce benefits in lieu of a rate increase. The treatment of these elections often will be consistent with the application of assumptions when projecting future experience.

  - Projecting the experience after a premium rate increases may address differences among measurements using counts, premiums, or benefit units (see "Exposure Basis Weighting" below.)

- In periods of extreme economic stress, lapse rates may spike up, especially for the younger attained ages (generally less than 60). The actuary could also consider whether it is necessary to adjust the historical experience for periods of extreme economic stress (e.g. 2008–2010).

- Exposure Basis Weighting

  - The actuary could also consider whether lives can be used directly in a persistency study or weighted with a measure of insurance coverage, such as premium or benefits in force.

  - Using a weighted lives approach might be appropriate if the actuary believes policyholders will exhibit different termination patterns based on the level of insurance coverage. As an alternative, termination rates could be constructed and applied separately by level of insurance coverage.

- Credibility

  - The size of a block of business and related credibility of the data for setting assumptions often will be considered when studying experience.

  - In general, voluntary lapse data tends to comprise a larger portion of terminations in early policy durations, and thus emerge earlier for study purposes.

  - Conversely, mortality and benefit exhaustion decrements tend to become more prevalent as a portion of terminations as individuals age, so data for study purposes may not be as credible until the block of business is more mature.

- Expected Assumptions for Evaluating Model Fit

  - When completing an experience study, it is important to include all projection assumption components in examining how well expected assumptions match actual data.

  - Expected assumptions could also reflect calendar year and mortality improvement influences as applicable.

  - Leaving out components of expected persistency assumptions such as calendar year and mortality improvement influences may skew the pattern observed in setting other components of persistency.

Q14. How often are persistency studies performed?

As detailed in the morbidity section, studies often will be performed as frequently as is needed to detect material changes in the underlying experience and future expectations. It is common practice for larger, more material blocks to perform studies at least once a year. However, for less material blocks, the actuary might consider performing studies less frequently.

Credible lapse experience in earlier durations may emerge earlier to study.

Refer to the morbidity section for more details on additional considerations on the frequency of performing experience studies.

Expenses

Q15. What type of expenses are included or excluded?

Acquisition, maintenance, commission, premium tax, claim settlement, investment, and overhead expenses often will be considered. This is true for pricing, reserving, asset adequacy analysis, and regulatory filings. Acquisition expenses are usually excluded from asset adequacy analysis because only in-force business is included. First-year and renewal commissions might be considered but some states do not allow rate increases to be commissionable. In some instances, overhead can be excluded for a product line if one can show in aggregate the company can cover its overhead expense (for example, when calculating a Premium Deficiency Reserve). It is common practice for extraordinary expenses to be excluded in the development of the expense assumption if the expense is a one-time event or not a cost going forward.

Q16. How are expenses reflected?

Expenses are most often expressed as per policy, percent of premium, per face-amount, percent of assets, per disabled life, or percent of paid claims.

Depending on the analysis being performed, reflecting expenses before or after a reinsurance cession can make sense. If projecting on a ceded basis, it is important to understand the terms of the treaty for expenses and then accurately reflect the treaty terms and expense structure in any analysis. The actuary should be aware of any required accounting practices that pertain to expenses being modeled. For example, SSAP 61R states how expense allowances are to be accounted for in the annual statement, as well as discussing the establishment of an immediate liability (Present Value of the shortfall) if the renewal expense allowance is not sufficient to cover anticipated renewal expenses of the ceding entity.

Investment expenses are often modeled separately from other expenses and sometimes they are not explicitly modeled. They are commonly reflected as a negative to investment income, a percent of assets, or reduction to the earned rate.

Q17. How are expenses checked for accuracy?

Due to the variation of expense levels by company, most expense assumptions are based on company experience. It is important to validate expense assumptions on both a dollar and unit basis. Company annual statements are a good source to reconcile expense assumptions.

Q18. How do expense assumptions change over time?

For some actuarial projections, it is reasonable to assume a change in expense going forward. For example, future cost-cutting or economies of scale may justify a change in assumption in the

future. Expenses that are reflected as a percent of claims or premiums inflate naturally as claims and premiums increase. It is important to understand the particular product features and decide if the basis of expense is inflating or not and then model appropriately. For example, benefits will typically increase for policies with inflation offers. For claims practices, it is not unusual to split claim expenses into a base component that does inflate going forward and a non-inflating component. Per-policy maintenance expenses are usually increased for inflation. Common practices include the use of a flat rate or a rate tied to the CPI or the 90-day Treasury. A floor is sometimes used when the rate is tied to an index. It is also reasonable to consider a maximum to reflect specific policy caps.

Rate Increases

Q19. In what cases are future rate increase assumptions utilized?

There are different approaches depending on the intended application.

- Statutory—Because the statutory active life reserve calculations and assumptions must conform to fairly rigid constraints, future rate increases are generally not used for active life reserves.

- Statutory Premium Deficiency Reserves—These calculations require the use of reasonable assumptions; however, treatment of future rate increases will vary by state, so consultation with the appropriate regulator(s) might be considered.

- Cash Flow Testing/Asset Adequacy—Under Actuarial Guideline LTC (AG51), effective with LTC reserves reported 12/31/2017 and later, future rate increases can only be used if based on a rate increase plan that is documented, is supported by and has been approved by management, and is highly likely to be undertaken. Not all companies are within scope (10,000 in force lives and greater) for the guideline and some jurisdictions may require any assumed rate increases to have already been filed or already approved.

- GAAP Benefit Reserves—Because GAAP reserves are locked in at issue, future rate increases are not typically considered unless loss recognition applies. Future rate increases might be considered in a Purchase GAAP situation.

- GAAP Premium Deficiency Testing—Because the assumptions for premium deficiency testing are to be based on best estimates (see ASOP No. 10), many actuaries believe it is appropriate, and potentially even required, that realistic assumptions regarding future rate increases be taken into account. The actuary might consult with the company's auditor regarding all loss recognition assumptions.

Q20. How are the rate increase assumptions determined?

Once it has been determined that it is appropriate to include future rate increases in projections, the actuary will need to decide exactly what level of assumptions to use. Whether the assumptions should be best estimate or contain some level of conservatism depends on the intended use, but in

all cases, the actuary will often consider several factors. Future rate increase assumptions often will be supportable based on past approvals, premium volume by state, state rate increase caps/restrictions, the changing regulatory climate/personnel in each jurisdiction, and the likelihood of approval. The actuary often will consider that approvals may become less likely as the additional rounds of rate increases are requested and may differ depending on the era in which the policy was issued. The timing of future increases will also often be considered, including approval time lags, phase-in of large increases, and implementation lags.

Actuarial Guideline LTC (AG51) notes that assumptions used should reflect a reasonable estimate of regulatory approved amounts and implementation timelines.

Some state regulatory agencies maintain rate increase histories, which can be a resource for setting future assumptions.

Q21. How are shock lapses considered in setting assumptions?

The actuary often will consider the potential distortion that shock lapses associated with prior rate increases can cause in experience study results. These distortions can impact persistency results through additional lapses and morbidity results through anti-selection.

Some companies may have the ability to identify the timing of rate increases within the policy record so that lapses can be associated with rate increase. The actuary can then subtract out the base level of lapse rates to determine the level of shock lapse.

Another approach might be to isolate experience without increases in order to set the baseline assumption. Some actuaries also consider reviewing experience by calendar year in order to assess trends in lapse experience that may relate to rate increases.

Q22. How should anti-selection be considered?

Actuaries exercise judgment in setting both the magnitude of anti-selection and the time period to which the anti-selective effect applies. Some actuaries consider varying the magnitude of anti-selective morbidity based on the magnitude of the rate increase. The anti-selection assumption often is proportionate to the shock lapse assumed.

<u>Investment Returns/Discounting</u>

Q23. What approaches are used for setting investment return or interest discount rate assumptions for different types of models?

Long-term care is a long-duration health product, and the interest assumptions can have a material impact on analysis of this business. As a result, it may make sense to use a more robust approach at reflecting investment assumptions than typically done for shorter-duration health products.

Cash flow testing is typically the preferred approach for statutory asset adequacy analysis for LTC given the asset/liability matching and reinvestment risks present for LTC (other approaches, such as a gross premium valuation, may be appropriate in certain circumstances). Cash flow testing involves a projection of in-force assets and future asset purchases under various interest rate scenarios. Cash flow testing also typically involves setting asset assumptions such as spreads over risk-free rates and default rates. ASOP No. 22, *Statements of Opinion Based on Asset Adequacy Analysis by Actuaries for Life or Health Insurers* and applicable state requirements should be reviewed for guidance on choosing the appropriate method. Regardless of asset adequacy method chosen, Actuarial Guideline LTC (AG51) states material assumptions shall be determined by testing moderately adverse deviations.

For loss recognition or premium deficiency (Gross Premium test) models, best estimate views of interest are typically used. Depending on the age of the block or status of new business, reinvestment rates as well as current earnings rates often will be considered. If the block is older or the outflows (claims) have reached the point of being larger than inflows (premium), then the use of a current earnings rate may make sense. On the other hand, if the block is younger or there is a growing block of business, reinvestment rates are often considered when determining earnings over a long-term horizon. Depending on the analysis, a best estimate view may make most sense as a long-term assumption or one that combines a short-term outlook with a long-term outlook.

For rate increase filings and minimum reserves, investment assumptions are often prescribed by state regulators or the NAIC.

Section B: Financial Reporting and Valuation

Q24. What would cause assumptions for contract reserves to vary across accounting bases/valuation methods?

Assumptions used for valuation of LTC reserve liabilities vary depending on the reserve basis and the methodology used to calculate the reserve. The selection of the assumption to use in a reserve calculation depends upon whether the reserve basis is statutory, tax, or GAAP and whether the reserve is a basic contract reserve or an additional reserve such as a premium deficiency reserve, additional asset adequacy reserve or GAAP loss recognition. Assumption bases range from:

1) Original best-estimate assumptions with provision for adverse deviation,[2] which is usually associated with the GAAP reserve. Original best estimate may be updated for subsequent issue years even if premiums are not updated.
2) Original pricing assumptions with margin for conservatism (which might include regulatory minimums that are meant to add conservatism) where pricing could be associated with the

[2] The drafters of this practice note are not commenting on whether the provision for adverse deviation (PAD) could be the same as the Margin for Adverse Experience (MAE).

original setting of new business rates or updated best-estimate assumptions with no updates to new business premium and are usually associated with statutory reserves.

3) Pricing assumptions with margin for conservatism.
4) Current best-estimate assumptions with provision for adverse deviation. This method is often used for GAAP reserving for new issue years as well as statutory asset adequacy testing.
5) Current best-estimate assumptions, which is usually associated with a gross premium valuation. This calculation is often utilized for premium deficiency testing and GAAP loss recognition testing (LRT).

Q25. What are the assumptions and methods used for determining statutory reserves? What approaches are used in assessing the adequacy of the reserves?

Statutory contract reserves are calculated using a net premium reserving methodology. Determination of premium deficiency reserve generally utilizes gross premium valuation methods and compares the result to the statutory reserve held. Although a gross premium valuation method is still used, the more common current industry practice is to also utilize a cash flow testing methodology to perform asset adequacy testing. Actuarial Guideline LTC (AG 51) states the method used shall conform with ASOP No. 22 in recognition of significant asset-and- liability related risks associated with long-term care.

Statutory contract reserves are calculated using the original net premium established for the current benefits of a given policy. The net premium calculation often utilizes a pricing basis unless any particular assumption is prescribed by minimum reserving standards. If the statutory contract reserve is determined to be inadequate, additional reserves may be established utilizing one the following approaches:

- Premium Deficiency Reserve (Exhibit 6 Line 3)
- Asset Adequacy Reserve (Exhibit 6 Line 3)
- Change in assumption basis (Exhibit 5A)

Note that for a change in basis, reductions to tax reserves are graded in over four years, and increases to tax reserves are reflected in one year. More details regarding tax reserve basis changes are reflected in Q27 below.

Statutory reserve adequacy often will address both premium deficiency and asset adequacy requirements. Generally, it is more common that the need for a premium deficiency reserve is established using a best-estimate assumption basis. According to the NAIC Health Reserves Guidance Manual (HRGM), a gross premium valuation is utilized at a line of business level so only LTC groupings that are marketed, serviced and measured on the same basis may be aggregated for analysis (subject to reasonable size of block for separate review). Although the current guidance allows for the use of best-estimate, there may be instances where regulators ask companies to consider more conservative assumptions than what the company has established as best-estimate. Asset adequacy testing requirements for Life insurance companies include establishing adequate reserves using moderately adverse assumptions. Therefore, determination of the need for and amount of additional asset adequacy reserves is generally established using an

assumption basis that utilizes best-estimate with provision for moderately adverse assumptions. For asset adequacy testing, companies are generally allowed to aggregate results across all lines of business analyzed. Under Actuarial Guideline LTC (AG51), companies are allowed to aggregate across lines of business if Cash Flow Testing is the method used for analysis, but LTC specific results must be reported.

Q26. What are the assumptions and methods used in determining GAAP reserves? What approaches are used in assessing the adequacy of the reserves?

GAAP benefit and maintenance expense reserves and DAC are calculated using a net premium methodology. Assumptions are locked in at issue (FAS60/ASC 944) and are generally based on original pricing or best estimate with provision for adverse deviation. GAAP adequacy testing generally utilizes gross premium valuation methods and compares the result to the net GAAP liability (i.e., reserves less DAC). Testing assumptions are typically based on current best estimate expectations.

When GAAP adequacy testing shows a deficiency, then the net GAAP liability is usually increased to eliminate the deficiency. There is no prescribed order of increase in benefit reserves or decrease of DAC. The assumption basis will be the new best estimate assumptions without provisions for adverse deviation, and is usually locked in. The actuary often will consider the methods and issues in implementing the loss recognition. There is a range of practice on the implementation.

Even though GAAP adequacy testing shows a sufficiency, Profits Followed by Losses (PFL) liability may be required. This is particularly true if there have been rate increase(s) on the LTC business. The issues of PFL are addressed in the practice note *GAAP Accounting for Profits Followed by Losses in Long-Duration Contracts*.

When utilizing an assumption base of best-estimate with provision for adverse deviation (PAD), the need for raw assumptions to be precisely equal to best-estimate may depend on whether provision for adverse deviation used in the varying reserve adequacy tests is considered one assumption at a time, in aggregate, by using a combination of conservative assumptions and aggregate margin or by analysis of sensitivity testing of results.

Q27. What are the methods and assumptions used in determining tax reserves?

Tax reform, officially titled the Tax Cut and Jobs Act, is effective for tax years 2018 and subsequent years. This entails significant changes to tax reserve calculations. The prescribed tax method is now the NAIC prescribed method. For LTC, that is 2-year Preliminary Term for issue years through 1991, and 1-year Preliminary Term for subsequent issue years. Mortality tables and interest rates are no longer prescribed for tax. Tables and interest used for the calculation of the reported statutory reserves are required. The tax reserve is 92.81% of the reserve calculated using the prescribed tax method. Deficiency reserves continue to be excluded for tax basis. There is a cap of the reported statutory reserve at the seriatim level, but it would be unusual for this to be a limit for LTC. Changes in tax basis reserves previously addressed in section 807(f) are now

treated the same as section 481 for any other change in accounting method. Reductions to tax reserves are graded in for four years, and increases to tax reserves are reflected in one year. This is different than the previous requirement of section 807(f) to grade in all changes in tax basis reserves over 10 years.

Note that any one-time impacts to tax reserves as the result of the Tax Cut and Jobs Act are graded into taxable earnings over eight years.

Q28. In what ways might statutory valuation and reserve adequacy testing assumptions vary from pricing assumptions?

Valuation assumptions are generally but not always more conservative than pricing. In some cases, current best-estimate may recognize experience that has been more or less favorable than anticipated at the time of original pricing. This may arise when current experience studies are used for the valuation assumptions of new issue years.

Reserve adequacy testing assumptions would typically vary from pricing assumptions because the reserve adequacy testing assumptions are based on current best-estimate assumptions and the observance of actual developing experience since the time that pricing assumptions were originally set. The provision for moderately adverse deviation used in asset adequacy testing may be demonstrated through scenario testing as opposed to implicit or explicit adjustments to best-estimate assumptions.

Statutory valuation assumptions may differ from pricing because some valuation assumptions are prescribed by regulation. The requirement could be in the form of a maximum (e.g., valuation interest rates or lapse rates).

Pricing for recent issues of LTC contracts require a provision of moderately adverse experience (MAE). Valuation and cash flow testing assumptions often will include provisions for adverse deviations (PAD). The MAE may be different from the PAD.

Q29. What reserves does the Health Insurance Reserves Model Regulation require companies to hold?

The model regulation requires the following reserves:

- Claim Reserves
- Premium Reserves
- Contract Reserves

Q30. What other types of reserves could a company consider?

The other types of reserves that the actuary often considers holding include premium deficiency reserves and additional cash flow testing (CFT) reserves.

Q31. Are these types of reserves differentiated in any way for long-term care?

No. For long-term care, most companies will hold a reserve for each of the categories described in the Health Insurance Reserves Model Regulation. Also, most companies will perform some type of asset adequacy reserve testing as well as premium deficiency reserve testing for their long-term care business.

Q32. What is the purpose of contract reserves?

Contract reserves pre-fund claims incurred after the valuation date. Pre-funding typically applies to an LTC policy because expected future incurred claims increase with attained age and eventually exceed expected future premium payments, where premium payments are typically expected to be level for the life of a policy (or end prior to the end of the premium paying period for limited pay and paid-up policies). Additional information on current and emerging practices concerning contract reserves is included in the practice note titled *Practices for Preparing Health Contract Reserves*. In addition, guidance can be found in ASOP No. 42, *Health and Disability Actuarial Assets and Liabilities Other Than Liabilities for Incurred Claims* (issued March 2018; effective August 1, 2018). Other references include:

1) NAIC Health Insurance Reserves Model Regulation
2) SSAP No. 54 including Appendix A-010
3) FASB ASC 944-40
4) ASOP No. 18, *Long Term Care Insurance*

Q33. What are the key considerations in calculating an incurred claim reserve?

The purpose of the incurred claim reserve is to establish a liability for the claims that have been incurred prior to the valuation date but are unpaid. The actuary should consider ASOP No. 5, *Incurred Health and Disability Claims*, when calculating incurred claim reserves. The actuary should also consider ASOP No. 18, *Long-Term Care Insurance*.

Specific to LTC, ASOP No. 5 indicates that the tabular method is generally used for long-term claims. There are no prescribed claim termination tables for LTC. ASOP No. 18 indicates that company-specific data is preferable. Where such data is not credible for the purpose, industry data should be considered.

Actuaries might consider several dimensions on which to set claim termination assumptions. Claim termination assumptions are generally set separately for claim recovery and on-claim mortality, as there are different patterns of termination for each. Considerations for claim recovery might include:

- Claim situs
- Age at claim
- Duration of claim
- Gender
- Benefit Period (or lifetime maximum)

- Inflation benefit
- Marital status
- Diagnosis

Considerations for on-claim mortality might include:

- Claim situs
- Age at claim
- Duration of claim
- Attained age
- Gender
- Benefit period (or lifetime maximum)
- Marital status
- Diagnosis

In calculating incurred claim reserves, benefit utilization often will be considered. In calculating incurred claim reserves, future benefit utilization (daily or monthly maximum) may be considered to change from historical utilization. This is particularly true when daily or monthly maximums are not increasing at the same rate as the LTC expenses. There may be significant differences between (1) the change in the maximum daily or monthly benefit, and (2) the change in LTC expenses. The actuary may consider basing the change in utilization on an economic assumption, thus reflecting the inflationary environment in the general economy.

In calculating incurred claim reserves, the actuary will often consider when a reserve for an active claim is first established. Generally, there are two possibilities:

- Incurred date
- Satisfaction of elimination period

Such consideration often will be consistent with the calculation of the duration of claim used for the calculation.

In addition to calculating incurred claim reserves for active claims, additional considerations are:

- Pending claims
- Closed But Not Reported claims
- Re-Opened claims

Pending claims are those for which there has been some indication of a claim reported, but the claim has not been completely adjudicated, or may not have satisfied the elimination period. Incurred claim reserves for such claims may be calculated similarly to active claims with simplified assumptions as the claim characteristics are unknown, together with an adjustment for the probability of becoming an active claim. Alternatively, such claims may be included in the Incurred But Not Reported (IBNR) calculation until they become an active claim. Closed But Not Reported (CBNR) claims are those which will ultimately have a closed date prior to the valuation

date, but are still active as of the valuation date. Similarly, Re-Opened (RO) claims are those which were active in the past, are closed as of the valuation date, but will ultimately have a re-open date prior to the valuation date. Both CBNR and RO reserve adjustments may be calculated as claim inventory adjustments based on historical experience.

In addition to setting a reserve for basic LTC benefits, considerations for supplementary benefits often will also be made. For Waiver of Premium (WoP) benefits in particular, considerations for incurred claim reserves depends on the manner in which the claim cost tables used for determining Active Life Reserve (ALR) are designed. Incurred claim reserves for WoP benefits are required if the ALR is determined on a total lives basis—i.e., assumes premiums are paid for all in-force. If the claim cost assumption used for ALR requires ALR to be held for all in-force policies, even those on active claim, DLR often will be held for WoP benefits (if any) for consistency with the ALR. Alternatively, if the claim cost assumption used for ALR assumes that ALR is held only for active lives, often no ALR is held for disabled policies on active claim. Therefore, no DLR for WoP benefits is needed to fund the ALR in this case. (Refer to SSAP No. 54, Appendix A-010, Exhibit 2 for Statutory Reserving explanatory material regarding Waiver of Premium.)

In addition to calculating incurred claim reserves for active and perhaps pending claims, incurred claim reserves often will be calculated for the IBNR. IBNR is the incurred claim reserve for claims that have been incurred prior to the valuation date but have not been reported. For IBNR, the actuary might consider methods other than tabular for estimating IBNR. Some actuaries include claims which have not been completely adjudicated (Pending claims) in the IBNR.

Sometimes actuaries include Pending claims in an In Course of Settlement reserve (ICOS). Otherwise ICOS represents the liability for accrued benefits for reported claims as of the valuation date that have not yet been paid. When ICOS is identified separately from other claim reserves, the disabled lives reserve is limited to the liability for future benefit periods following the valuation date. ICOS may be calculated from the seriatim claim payment data.

Generally, the difference in incurred claim reserves for U.S. GAAP and U.S. statutory is due to the use of different interest rates. For U.S. GAAP, assumptions for incurred claim reserves are referenced in FAS 5 (ASC 450) and is a best-estimate reserve. The U.S. GAAP interest rate often will be the best estimate of the portfolio earned rate(s) for the duration of the incurred claim reserves. Due to the use of best-estimate assumptions, the actuary often will consider this assumption periodically. For statutory, the maximum interest rate for the incurred claim reserves is the rate used for whole life insurance (by issue year) applied to that year of incurral. Note that the interest rate is a maximum, not prescribed.

Q34. What are the key elements of Premium Accrual Reserves?

Unearned premium reserves represent the portion of premiums paid for time periods beyond the valuation date. As premiums are collected, unearned premium reserves prevent the premiums from being immediately reflected in income. As the unearned premium reserve is released, the income is reflected as the premiums are earned.

The unearned premium reserve is calculated as the pro rata unearned modal premium that applies to the premium period beyond the valuation date. When contract reserves are calculated, the calculation generally utilizes valuation net premiums on the contract reserve basis. In some cases, insurers choose to hold gross unearned premium reserves to reflect items including, but not limited to, the impacts of rate increases and the potential to add margin to the liabilities. Generally, GAAP accounting utilizes similar approaches to statutory accounting, employing GAAP net premiums when a net unearned premium approach is in place.

Other premium accruals, including advance and due premiums, may require actuarial considerations. With respect to these accruals, LTC functions in the same manner as other health products being represented in the financial statements. Additional guidance on premium accruals is included in ASOP No. 42, *Health and Disability Actuarial Assets and Liabilities Other Than Liabilities for Incurred Claims* (effective August 1, 2018) , as well as applicable state reserve regulations.

Q35. What are the statutory reserve methods that have been driven by differing state regulations?

State regulations typically refer to specific regulations of the state, the NAIC Accounting Practice and Procedures Manual (which in Appendix A-010 seeks to match the NAIC Health Insurance Reserve Model Regulation) since 2001, or the Valuation Manual (as required by revisions to the Standard Valuation Law) effective in most states for policies issued on or after 1/1/2017.

For LTC policies and group certificates issued prior to 1992, the minimum reserve is the reserve calculated on the 2-Year Preliminary Term method (see NAIC Health Insurance Reserve Model Regulation). For issue years 1992 and later, the minimum reserve is the reserve calculated on the 1-Year Preliminary Term method. Not all states that adopted the model regulation did so at the same time. In a few states, the model has not been formally adopted, but conforming to the model could be required in practice. Generally, it is appropriate for actuaries valuing LTC liabilities to consult with their domiciliary state regarding the requirements. As to ranges of practice, some actuaries have calculated reserves for all new issues using the 1-Year Preliminary Term method; others varied the valuation method by state of issue.

Lapse and mortality minimum reserve requirements were the same as for other A&H prior to 1997. As experience on LTC developed, lapse rates reflected changing policy holder behavior. This is observed through industry experience studies (SOA LTC Intercompany Experience Studies). Also, it became apparent from industry studies that LTC experience is more closely related to annuitant mortality than life insurance mortality as a result of policyholder (anti) selection. As a result, LTC minimum reserve requirements were revised in 1997 that distinguished LTC from other A&H. The minimum reserve requirements were changed again in 2005 to reflect yet lower lapse and mortality. Again, not all states adopted the change with the same effective date. These changes have resulted in higher minimum reserves for both the changes in lapse and mortality. Actuaries have reflected the new minimum reserve requirements for all new issues, or by issue state.

Lapse rates are capped for the minimum reserve. These requirements (see NAIC Health Insurance Reserve Model Regulation) have been revised and are applicable for new issues following the effective date of each revision. For LTC policies issued prior to 1997, the cap on lapses was the same as other A&H policies for which premium rates are not guaranteed. This original cap in the Model Regulation is a cap on the total terminations (including mortality) and is the lesser of 80% of the total termination rate used in pricing and 8%.

The minimum reserve cap on lapses has been stated as the lesser of x% of the pricing lapse assumption and a y% lapse rate (see lapse rates noted below). There is a range of practice as to what actuaries consider to be pricing. Pricing may refer to the assumptions for which the original rates were filed. For the purpose of the minimum reserves, that maximum lapse rate would be unchanged for a particular policy form. Other actuaries may perform repricing exercises periodically using most recent experience studies. This may or may not result in refiling of rates. Whether or not the repricing results in new rates being filed, the valuation actuary may revise valuation assumptions for subsequent issue years based on the recent experience studies and repricing exercise.

The cap on lapse rates subsequent to 1997 is a cap on voluntary lapse only. For issues of 1997 through 2004:

- For policy years 1-4, the lesser of 80% of the lapse rate used in pricing and 8%
- For policy years 5 and later, the lesser of 100% of the lapse rate used in pricing and 4%

For issue years 2005 and later:

- For policy year 1, the lesser of 80% of the lapse rate used in pricing and 6%
- For policy years 2-4, the lesser of 80% of the lapse rate used in pricing and 4%
- For policy years 5 and later, the lesser of 100% of the lapse rate used in pricing and
    - 2% for individual policies
    - 3% for group certificates

Mortality rates used for the calculation of minimum reserves as specified in the model regulation are:

- For issue years prior to 1997: the same as used for whole life insurance
- For issues of 1997–2004: 1983 GAM
- For issues of 2005 and subsequent: 1994 GAM

Principle-based reserving (PBR) requirements have been developed for other lines of business and considered for LTC. Such requirements may be adopted or modified after this practice note is finalized.

Q36. What are the considerations in moving from a total population claim cost model to a first-principles model?

A typical claim cost model projects total (on claim and off-claim) lives. Future claims are projected by applying claim costs to a lives metric. Some claim costs are developed relative to total lives, others relative to off-claim lives. Many models use a factor approach (exposure or j prime factors) to split between on-claim and off-claim lives.

A typical first-principles model will split the projection of in force lives into on-claim and off-claim lives. The exposure factors depend on the model assumptions for morbidity (incidence, termination) and policy termination (death and lapse) assumptions. Different exposure factors apply if the model assumptions are different as may be the case for GAAP vs. statutory models. Exposure factors are needed when a total lives model is used with claim costs developed from active lives only.

Future claims are projected using disaggregated assumptions including models that use:

(a) incidence and severity, or
(b) incidence and claim persistency and benefit utilization, or
(c) incidence, claim persistency, site of care transitions, and benefit utilization.

When actuaries only apply incidence rates to active lives, they recognize in their modeling that some disabled lives are expected to recover before using up their lifetime maximum benefits.

The reasons for making the change may include the following:

(a) Improve modeling to capture the interactions between claim and policy persistency. As an example, in a typical claim cost model, a 1% worsening in morbidity from higher incidence increases the value of future claims 1%. In a typical first-principles model a 1% worsening of incidence may increase the value of future claims less than 1% because the increased number of on-claim lives have higher mortality.

(b) Improve the experience analysis, assumption setting, and review of financial experience, pricing, and product development by having greater visibility into the components of claim experience (incidence, claim persistency, and benefit utilization.)

(c) As an increasing percentage of in force is projected to become on claim, claim cost models become incrementally less accurate, less able to measure sensitivities and to appropriately quantify the risks.

The key considerations in making the change are:

1. Developing the assumptions needed. Actuaries usually find it necessary to set mortality and lapse assumptions for off-claim lives separately from death and recovery assumptions of on-claim lives and to disaggregate claim costs into component pieces. In assumption development, several challenges will be faced, including:

    a. Reconciling disaggregated claim costs back to component pieces.
    b. Reconciling on- and off-claim persistency back to total policy persistency.
    c. Handling the reduced credibility that is often associated with more granular assumptions, particularly in the tail.
    d. Determining how total population assumptions like mortality and morbidity improvement will operate in a disaggregated environment.

e. Handling inconsistencies in existing assumptions that become apparent when the assumptions are disaggregated.
f. Being sure that an inadvertent change in assumptions has not occurred simply because a different level of granularity has been used.

2. Developing the software needed. Some industry software exists; some companies write their own in-house models. In both cases, the challenges include creating the specifications, testing and auditing the model, completing a stepwise reconciliation from old model to new model for management, and understanding the sensitivities to change in experience measured at the new more granular level. Another challenge is maintaining legacy models. These are often needed years later to handle questions arising from regulators and management.

3. Deciding on how to handle any changes in reserves or reserve adequacy testing results emerging from the new model from an accounting, audit, or regulator perspective. In a first-principles conversion, the conversion of reserve adequacy testing models (GAAP Loss Recognition Testing and Statutory Cash Flow Testing) has the potential to have a more significant financial impact than the conversion of reserve calculation models for valuation.

4. Deciding on precision. A first-principles reserve test is a more accurate measurement. The change in reserve testing (period to period) is better understood from a first-principles model. When converting to first principles for reserve testing, a test valuation as of a prior period will identify the impacts from the conversion. Step-wise attribution analysis may be done in order to identify the separate impacts. Such analysis could be documented for the benefit of management. Reserve testing uses best-estimates assumptions (plus margin for adverse experience for statutory cash flow testing.)

5. Deciding on how to calculate the reserves for in-force business and new business. The task of disaggregating historical reserve assumptions can be formidable and may face accounting or regulator challenges. Adopting disaggregated assumptions for reserves on new issues and holding existing assumptions on old issues is an alternative to be considered. Not adopting first principles for in force can minimize the gain achieved from making the decision to implement a first-principles modeling approach. The significance of the in-force LTC block to the company may be a factor in deciding which blocks to proceed with the change. Another aspect to consider is whether the policy reserves are to be held on all lives or only active lives. The industry is moving from claim-cost models to first-principles. The decision is whether to streamline the models across the entire block or just for new business. Eventually claim-cost models won't be updated with experience and won't be useful for understanding in-force blocks.

6. Other related metrics may change. The differences between the old model with aggregated assumptions and new model with disaggregated assumptions will likely alter other metrics, such as the Value of New Business or the Embedded Value.

7. Management of the overall project can be a challenge. A typical first-principles project requires a large volume of systems work, actuarial work on models, experience studies and assumption development, audit and control work, and financial management to rigorously analyze, understand, and explain any changes in view arising from the new model. For most companies this is a multiyear project.