Guidelines for Constructing a Psychometric Index

Applied to the Compassionate Disclosure of (Perinatal) Loss (CDL) Index

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1. Overview

A psychometric index is a composite measurement tool that translates a theoretical construct into a set of observables, quantifiable survey items. When rigorously developed, such an index enables researchers, clinicians, and policymakers to measure, compare, and track the construct across populations, settings, and over time.

These guidelines document the methodological steps used to construct the Compassionate Disclosure of (Perinatal) Loss (CDL) Index, as reported in Hall, Malhotra et al. (2025). The CDL index was purpose-built to measure the degree to which healthcare providers communicate the news of perinatal loss with compassion and sensitivity. It fills a gap left by existing perinatal care instruments, which do not specifically capture the moment of loss disclosure.

Why a new index was needed

Although validated tools existed to assess autonomy in decision-making and respectful care, no existing instrument specifically measured the quality of compassionate communication at the critical moment when a family first receives news of their pregnancy or infant loss. The CDL index was developed to address this gap.

2. Step-By-Step Construction Process

The CDL index was constructed following a sequence of methodological steps consistent with best practice in psychometric scale development. Each step is described below.

2.1) GROUNDING THE CONSTRUCT IN THEORY AND EXPERIENCE

The CDL index emerged from inductive analysis of patient narratives and empirical data from the RESPCCT study. The following explanation documents the post hoc conceptual framing of the six domains identified through this analysis.

- Define the latent construct precisely. For the CDL, the construct was the degree of compassion and sensitivity with which healthcare providers disclose perinatal loss to the individual or family.
- Draw on patient narratives, existing qualitative research, and published literature to identify what compassionate disclosure looks, sounds, and feels like in practice.
- Item development drew on community expertise. The RESPCCT Community Steering Council and stakeholders, comprising individuals with diverse lived experiences, reviewed the survey questions for appropriate language to ensure they resonated with the experiences of diverse populations.

2.2) DOMAIN IDENTIFICATION

Post hoc domain identification. After analyzing patient narratives, six conceptual domains emerged as central to compassionate disclosure:

Domain	Concept	Operational meaning
Domain 1	Privacy protection	whether the individual received the news in a private setting.
Domain 2	Presence of social support	whether a support person (partner, family, or friend) was present.
Domain 3	Time to process	whether the individual and support person were given adequate time to absorb the news.
Domain 4	Provider empathy	whether the healthcare provider was perceived as kind and caring.
Domain 5	Provider competence	whether the provider was perceived as skilled and trained to care for people experiencing loss.
Domain 6	Information provision	whether the individual was given complete information about options (e.g., post-mortem examination).

2.3) ITEM DEVELOPMENT

The CDL items were introduced with the framing sentence: *"The following questions are about the time when you first heard about your loss."*

There was a one-to-one matching between each domain and a survey question that survey respondents answered based on direct experience.

In general, for item development, the key principles at this stage:

- Use clear, plain language accessible to participants of diverse educational backgrounds.
- Ensure each item is unambiguous and maps onto a single domain only (no double-barrelled items).
- Introduce the item set with a common framing sentence to orient respondents to the relevant time period.

2.4) RESPONSE FORMAT AND SCORING

Select a response format that is appropriate to the construct and the sample. For the CDL index, a dichotomous response format was used for each item, with scoring as follows:

- Yes (agreement) = coded 1
- No (disagreement) = coded 0
- Do not remember = recoded as 0 (interpreted as a negative response, on the rationale that a strongly positive experience is unlikely to be forgotten)
- Not applicable = permitted for Item 6 only, given that post-mortem examinations are not always offered or relevant

The composite CDL score is the simple sum of all six item scores, yielding a range of 0 to 6. Higher scores indicate greater compassionate disclosure at the time of loss.

Rationale for the 'do not remember' recoding rule

Treating 'do not remember' as equivalent to 'no' rests on a theoretical assumption: if a healthcare encounter had been warmly compassionate, privacy-protected, and emotionally supportive, the individual would be likely to recall it. The inability to recall is therefore treated as consistent with the absence of a clearly positive experience, rather than as a neutral or missing data point.

2.5) PILOTING AND CONTENT VALIDATION

The CDL index was constructed within the broader RESPCCT study, which used multiple validation strategies for the complete 210-item survey instrument:

- Cognitive interviewing with diverse participants to confirm comprehension
- Expert review by clinicians, researchers, and community representatives
- Structured stakeholder consultation (Delphi method) for item endorsement

Administer the instrument to a representative sample. For the CDL index:

- Data were collected via the RESPCCT online cross-sectional survey (July 2020 – February 2022).
- Participants were individuals in Canada who had experienced a perinatal loss within the preceding ten years.
- The sample (n = 172) included individuals from all provinces and territories, with deliberate efforts to recruit historically underrepresented populations, including Indigenous, Black, and racialized participants.
- Planned abortions were excluded (n = 54) to ensure the sample reflected involuntary perinatal loss.

3. Psychometric Analysis

Once data are collected, the index must be evaluated using psychometric methods to establish its reliability and validity. Two key analyses are essential:

3.1) INTERNAL CONSISTENCY (CRONBACH'S ALPHA)

Internal consistency measures the degree to which all items in the index measure the same underlying construct. It is commonly assessed using Cronbach's alpha (α), where:

- $\alpha \geq 0.70$ is generally considered acceptable
- $\alpha \geq 0.80$ is considered good
- $\alpha \geq 0.90$ is considered excellent

For the CDL index, Cronbach's $\alpha = 0.80$, indicating good internal consistency. This confirms that the six items coherently reflect a single, shared conceptual domain (compassionate disclosure) rather than measuring unrelated characteristics.

3.2) FACTOR ANALYSIS

Factor analysis examines the underlying structure of the index — specifically, whether the items cluster into one or more latent factors. For a new index intended as a unidimensional measure, exploratory factor analysis (EFA) is used to test whether a single-factor solution adequately explains the observed item correlations.

For the CDL index, EFA results supported a unidimensional structure:

- A single factor with an eigenvalue of 3.07 was extracted, explaining 51.17% of the total variance.
- Factor loadings for each item ranged from 0.48 to 0.81, indicating that all six items contribute meaningfully to the single underlying construct.
- The likelihood ratio test ($\chi^2 = 274.58$, $p < 0.0001$) confirmed that the factor model fit the data.

Together, these results support treating the CDL as a valid, unidimensional index with a single composite score.

4. The Cdl Index: Complete Item Specification

The table below presents the full CDL index, with each item's corresponding conceptual domain and response options.

Item	Survey Question	Conceptual Domain	Response Options
1	I received the news about my baby/babies in a room where my privacy was protected.	Privacy protection	Yes / No / Do not remember
2	My support person (spouse, partner, family member, or friend) was present.	Social support presence	Yes / No / Do not remember
3	My support person and I were given time to be on our own to come to terms with the news.	Time and space to process	Yes / No / Do not remember
4	The healthcare provider was kind and caring to me.	Provider empathy	Yes / No / Do not remember
5	I felt the health care provider had the skills and training to care for people in my situation.	Provider competence	Yes / No / Do not remember
6	I was given full information about options for examinations for my baby/babies, such as post-mortem.	Information provision	Yes / No / Do not remember / Not applicable

5. Psychometric Results Summary

The following table summarises the psychometric properties and scoring specifications of the CDL index as reported in Hall, Malhotra et al. (2025).

Scoring	Each item is coded dichotomously: 1 = agreement, 0 = disagreement. Responses of 'do not remember' are recoded as 0 (negative), on the rationale that strongly positive experiences would not be forgotten.
Score Range	0 to 6 (sum of all items). A higher composite score indicates greater compassionate disclosure.
Mean Score (Study Sample)	3.69 (n = 172 participants in the RESPCCT Study, Canada, 2020–2022)
Internal Consistency	Cronbach's alpha = 0.80, indicating good reliability and coherence across items.
Factor Structure	Single-factor solution confirmed via exploratory factor analysis. Eigenvalue = 3.07, explaining 51.17% of total variance. Factor loadings ranged from 0.48 to 0.81 across all six items.
Model Fit	Likelihood ratio test: $\chi^2 = 274.58$, $p < 0.0001$, confirming the factor model fits the data.
Construct Validity	A unidimensional structure supports the interpretation of a single composite score representing compassionate disclosure.

Scoring	Each item is coded dichotomously: 1 = agreement, 0 = disagreement. Responses of 'do not remember' are recoded as 0 (negative), on the rationale that strongly positive experiences would not be forgotten.
Analytical Cut-off	The top quartile of CDL scores was used as a binary outcome variable in multivariable logistic regression to identify factors associated with more compassionate care.

6. Analytical Application Of The Index

6.1) GENERATING THE COMPOSITE SCORE

The CDL composite score is computed as the sum of all six dichotomously coded items (0 or 1), yielding a total score ranging from 0 to 6. In the study, composite scores were used both as a continuous variable (for descriptive statistics) and as a binary outcome for regression analysis.

6.2) TOP-QUARTILE BINARY VARIABLE

For multivariable logistic regression, the CDL composite score was dichotomized: individuals in the top 25% of the distribution were assigned 1 (high compassionate disclosure), and those below were assigned 0.

6.3) COVARIATE ADJUSTMENT

Regression models included the following covariates to isolate the independent associations of each predictor with care outcomes:

- Racial identity (IBPOC vs. White)
- Sexual minority status
- Age
- Income adequacy
- Educational attainment
- Place of residence (rural/small town, mid-size city, large city)
- Timing of loss (early/miscarriage vs. late/stillbirth, neonatal death, late second trimester)
- Year of pregnancy (to account for temporal trends, including COVID-19)

6.4) KEY FINDINGS FROM THE CDL INDEX

Multivariable logistic regression using the CDL top-quartile outcome revealed:

- Individuals experiencing late pregnancy loss (stillbirth, neonatal death, late second trimester) had significantly higher odds of reporting compassionate disclosure compared to those experiencing early loss (miscarriage): AOR = 3.08, 95% CI [1.22, 7.77].
- Individuals residing in large cities (>500,000) had higher odds of top-quartile CDL scores: AOR = 1.91 (marginally significant, $p < 0.1$).
- Racial identity (IBPOC) was not significantly associated with CDL scores in adjusted models, although IBPOC individuals reported significantly lower autonomy and respectful care on the MADM and MORi scales

7. Limitations And Considerations

Researchers applying these methods should be aware of the following methodological limitations identified in the original study:

1. The convenience sample was not randomly selected, which limits generalisability to specific subpopulations or jurisdictions.

2. The sample size (n = 172) limited the number of covariates that could be included in logistic regression models and resulted in wide confidence intervals, suggesting unstable estimates for certain predictors.
3. Retrospective recall of experiences spanning up to ten years introduces the possibility of recall bias. Temporal trends were partially controlled for using a year variable, but period effects cannot be fully eliminated.
4. Grouping Indigenous and racialized subpopulations into a single IBPOC category and aggregating sexual minority subgroups were necessitated by cell size constraints. This obscures within-group heterogeneity and should be addressed in future studies with larger samples.
5. The CDL index measures perceptions of compassionate disclosure from the recipient's perspective. It does not capture objective provider behavior or institutional protocols.

8. Implications For Research And Practice

8.1) RESEARCH IMPLICATIONS

- The CDL index enables comparative research across settings, loss types, and population groups, supporting equity-focused analyses.
- The index provides a foundation for developing and evaluating provider training interventions targeted at the specific moment of loss disclosure.
- Future studies should expand sample sizes to support disaggregated analysis by Indigenous, Black, and specific racialized and sexual minority subgroups.

8.2) CLINICAL AND POLICY IMPLICATIONS

- Healthcare providers in emergency, laboratory, and obstetric settings should receive training in compassionate communication at the time of pregnancy loss, regardless of gestational age.
- Institutional protocols should ensure privacy, support person access, and adequate processing time at the moment of loss disclosure.
- Equity-focused quality improvement initiatives should monitor CDL scores by racial/ethnic identity, loss timing, and care setting.

Core message for practice

> *The evidence from Hall, Malhotra et al. (2025) demonstrates that miscarriage, the most common form of perinatal loss, is disproportionately handled with less compassionate disclosure than later losses. Loss at any gestational age constitutes a significant reproductive trauma and warrants the same standard of compassionate, respectful communication.*

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Reference

Hall, W.A., Malhotra, N., Clark, E., Hodge, K., Griffith, G., & Vedam, S. (2025). Inequities in Care During Pregnancy Loss: Empirical Insights From Experiences With Canadian Perinatal Care. Birth, 2025; 0:1–9. https://doi.org/10.1111/birt.70020

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