

Psychotherapy access and young adults' registered relationship trajectories in Denmark

Bolero

Abstract

Registered research design and conditional interpretation policy; no outcomes observed.

Keywords: Pre-registration, research design

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Pre-registration: no experimental outcomes have been observed.

Study protocol and statistical analysis plan

1. Study identity, version and registration history

This is an adaptive, results-pending preregistration of the July 2021 Danish psychotherapy copayment waiver and young adults' residential, partnership and recorded parenthood trajectories. The central question is whether an expansion of access changes subsequent living arrangements and family formation. The study does not substitute employment or earnings for those outcomes. This editorial Blueprint, dated 9 September 2026 UTC (8 September in America/Chicago), starts from the supplied current six-Atom Blueprint/Transcriber World. It preserves all six experiments, including the previously added joint-transition and residential round-trip descriptions. It changes manuscript allocation and displays already registered quarterly comparisons; no new estimand, subgroup, outcome, test or activation rule is introduced. The native registrations, incorporated shared contracts and complete canonical appendix specify the analysis.

The supplied World was unexecuted. This registration is a disclosed pre-data amendment of the supplied baseline. The joint-transition and residential round-trip descriptions were added before study outcome access and were not part of its earlier

scientific assessment. All local empirical states remain pending. The history and scientific reasons for amendments are in `../sources/design-amendment.md`; detailed operational history stays outside the scientific delivery. This is prospective analysis of existing records, not prospective data collection. Investigators, institutional registration identifiers, a registry deposit and funding information have not been supplied. No external registration timestamp or approval is asserted.

2. Data sources, access boundary and prior knowledge

The authorized boundary contains 47 named tables. The study requires BEF population snapshots and SSSY reimbursed-service records, with optional dated mortality evidence from DODSAASG. The copied boundary and narrow schema extracts document these candidates. IND/IDAN are allowed but unnecessary to the registered design; AMRUN is not used because its documented 48.3% subset has unknown selection. No whole-FSV permission is inferred. Catalogue spans, variable definitions and file names do not establish delivered historical coverage, identifying variation or precision.

Only schema, documentation, public scientific literature and the supplied design materials were examined. No confidential rows, computed study outcomes, real-data sample counts or first-stage estimates were accessed. Existing public results were read to challenge assumptions and delimit contribution; none is a prediction or result for this study. We cannot certify all knowledge held by other project participants beyond the supplied history. The source ledger distinguishes new retrievals, inherited audits, partial access and unresolved appendices.

3. Background, theory and competing accounts

Access to individual psychotherapy could alter avoidance, planning, willingness to manage conflict, or decisions about living together and parenting. The same observable action has several possible meanings. A departure from the parental home could accompany a new partnership or independent residence; a return could reflect separation, mutual support or changing constraints. Partnership dissolution can represent an unwanted loss or a chosen exit. Births can be advanced, delayed or unchanged. The design therefore retains distinct outcomes without an index that assigns them normative signs.

Clinical research on individual psychotherapy already examines social and marital functioning. A small trial of individual interpersonal psychotherapy versus individual usual-care psychotherapy studied different relationship domains rather than a single household event. It motivates disaggregation, but its selected clinical population, active comparator and self-reported outcomes cannot determine this policy's effects. [Gamble et al.](#) Access-policy work in Denmark examines billed care, health and educational or labor outcomes; it prevents a claim that studying nonclinical access effects is itself new. [Kruse et al.](#), [Ejrnæs](#), [Gørtz](#) and [Waltenburg](#)

Three competing explanations remain central. First, care or clinical change may affect decisions, but reduced copayments can directly relax financial constraints and

existing users can benefit without additional treatment. Second, a national expansion can change waiting times, supply and service substitution, including exposure of baseline partners. Third, age/cohort changes, COVID-era shocks and administrative recognition can mimic policy-associated relationship changes. The study measures uptake, inspects recognition and tests fixed counterfactual challenges, but these comparisons do not isolate all pathways. The VIVE report’s rejection of causal attribution for its 2018 socioeconomic exercise after similar placebo patterns is direct motivation to keep these challenges visible. [VIVE report, pp. 32–33](#)

4. Questions, hypotheses and permissible claims

Atom 1 asks whether the documented reform creates a potential exposure contrast and a measured contrast in standard individual consultation billing. Atom 2 asks whether administrative family and partner recognition changes despite stable people and addresses. Atom 3 asks about departure, sustained residence apart and return; Atom 4 about recognized union entry and the continuity and dissolution of baseline unions; Atom 5 about newborn-linked recorded parenthood. Atom 6 asks whether specified transitions concern the same baseline people and what observed timing permits us to distinguish.

All main outcome tests are two-sided. The design does not predict a common sign or register equivalence regions. A supported main contrast is an access-regime contrast under explicit assumptions, not the effect of therapy received. A null uptake contrast cannot establish therapeutic ineffectiveness; a wide outcome interval cannot establish no relationship change. Joint descriptions establish neither causal mediation nor that one event caused another. No outcome measures friendship networks, loneliness, relationship satisfaction, intimate-partner quality or subjective recovery.

5. Population, sampling and fixed risk sets

For each index year c in $\{2017, 2018, 2019, 2021\}$, define the policy anchor R as 1 July c and the baseline B as 30 June $c-1$. Compare baseline residents aged 24 and 25 on R . Retain those who subsequently exit, die or cease to be observed; do not require residence or survival at R . Age 26 is used only for specified diagnostics. There is no sampling on eventual treatment, referral, marriage, children, moves or outcome response.

Each domain has a substantive pre-exposure denominator. Departure and sustained residence apart use baseline parental co-residents. Return uses persons known apart from their frozen baseline parents at all four required baseline-away snapshots. Recognized union entry uses people known unpartnered at B and the previous quarter. Original-pair separation and same-partner residence use stable recognized pairs at those snapshots. Legal entry and legal dissolution use their own baseline legal-status populations. Parenthood requires observed absence of prior child links in five preceding December snapshots and four baseline quarters, with the complete resident-child linkage universe and consistent index observation.

Atom 6 uses three intersections established entirely before follow-up: parental co-residence with no recognized partner; prior residence apart with a stable original pair;

and no recognized partner with recorded nonparenthood. Unknown membership is tabulated separately rather than recovered from future records. Descriptive bounds apply to known members, not all potentially eligible people. Different risk sets cannot be added into a population flow or compared as if their fractions shared a denominator.

6. Exposure, assignment and comparison structure

Official orders establish the waiver for ages 18–20 from 1 July 2018, expansion through age 21 from 1 October 2019, and expansion through age 24 from 1 July 2021. The 2021 scheme requires clinical eligibility, a GP referral and treatment by a contracted psychologist. It waives the residual copayment on the relevant scheme; age alone does not ensure treatment. [2018 Order](#), [2019 Order](#), [2021 Order](#)

The 2021 age 24 index cohort was too old for the earlier waiver. Its potential new-referral interval is from rollout to its 25th birthday; age 25 has no new entitlement from the expansion. Existing patients aged 22–24 transferred to the free scheme, and a course could continue after age 25. Eligibility days are therefore an opportunity measure, not days of treatment, and a birthday is not a sharp withdrawal of cumulative therapy. [July 2021 agreement](#), §2 The pre-announcement baseline retains possible anticipation during the year preceding rollout; earliest anticipation is not proved absent.

The design compares the age 24–age 25 difference in 2021 with the equally weighted corresponding gaps in 2017–2019. It does not register a sharp birthday RDD, a GP instrument, or a treatment LATE. The direct financial effect of copayment relief, other permitted consultation formats and supply responses prevent an unqualified therapy-only exclusion argument. Actual referral dates and clinical need are not inferred from SSSY fee weeks. Alternative historical age/time designs informed this choice but are not competing specifications to select after seeing results.

7. Outcomes and measurement

The measurement contract first validates unique person–snapshot records, invariant birth dates, dated civil/family/service dictionaries, effective fee-week mapping and many-to-one joins. Exact duplicate copies can be collapsed with accounting; conflicting records require resolution in a governed adapter, not arbitrary selection. Freeze baseline parent and original-partner identities and compare contemporaneous addresses. BEF’s E-family definition counts a co-resident child only below age 25, so family-ID or family-type changes cannot define moving out. Inferred partnerships have algorithmic scope; same-sex legal unions and inferred cohabitation are not interchangeable categories. Historical coverage and changes in household adult membership must be checked. [DST family definition](#)

Residential leave requires a young-person move from known parent co-residence to known residence apart from the relevant frozen parents. A parent-only move or death is not departure. Sustained residence apart requires a qualifying leave and four known final quarterly snapshots apart; it does not mean financial independence or uninterrupted daily residence. Strict return requires the young person to move to a

baseline parent’s address occupied by that parent at the preceding and current snapshot. The inherited round-trip description uses the original co-resident denominator and a confirmed leave followed in a later observed interval by strict return. It is not a return rate among selected leavers. A leave–return–leave sequence may satisfy both round-trip and sustained-away at the horizon.

Recognized union entry requires reciprocal recognized identity and a new shared address after both were previously at different known addresses. Recognition alone at an already shared address is not entry. Original-pair separation requires both people observed at different addresses; recognition loss alone is not separation. Same-partner residence at the horizon permits an intervening separation and reunion. Legal entry and divorce use dated civil status and original spouse identity. Widowhood, death and dissolution of a later union are distinguished from the registered original-union event. Baseline partner age and prior/new entitlement are descriptive exposure diagnostics, never post-treatment adjustments.

Recorded parenthood inverts resident children’s MOR_ID and FAR_ID, using newborn birth date, timely first parent-link recognition and confirmation within the prescribed two-quarter window. Older-child recognition and delayed links are separate diagnostics. The history can support recorded nonparenthood, not biological lifetime childlessness. BOERNFB is not used as a parent link. Births outside supplied linkage coverage, conception, pregnancy intentions and completed fertility are not inferred. Recognition after death does not create the registered event merely because birth preceded death; same-day ordering is not assumed. For the 24-month 2021 outcome the confirmation protocol can require child snapshots through December 2023.

Standard individual consultation uptake is any net-final positive billing under validated specialty63 first/follow-up code families 0110/0111, 0210/0211 or 0410/0411 across the relevant regimes. It is not the count of distinct clinical encounters, referral time, office setting, duration or psychotherapy modality. Dated code maps must cover 2016–2023, including historical double/remote coding changes. Other formats remain separate descriptive billing indicators; individual-use and other-format person fractions need not sum to one. The exact accounting and boundary-week sensitivity are retained in Atom 1.

8. Evidence sequence, allocation and displays

Main text explains the substantive puzzle, policy opportunity and billed use (Figure1), the indispensable recognition problem (Table2 and the main summary of FigureS1), and all nine relationship endpoints at h12/h24 (Figure2). It then asks what those endpoint summaries hide about timing. Figure3 (machine figure4) displays the already registered quarterly confirmed-record contrasts for uptake and all relationship endpoints, using the fixed baseline populations and the same era weights. Full historical gaps, adjacent-age and omitted-year diagnostics remain in TablesS3a–S3b. No timing contrast is an additional confirmatory test, and an apparently stable or delayed path cannot by itself establish onset or recovery.

Figure4 (machine figure5) subsequently describes joint observed events in the three original intersection populations, with eight exhaustive patterns and explicit unknowns. Table3 gives their six main 2021/h24 marginal/joint observation bounds.

TablesS9–S11 retain all original residential paths and joint cells. This separates marginal policy comparisons from observed same-person co-occurrence; it does not connect them through a mediation estimator or identify overlap of individual treatment effects.

Reader question	Registered source and form	Main / scientific SI	What remains unresolved
What opportunity and billed use changed?	Atom1 exposure ranges by birth month and two uptake interval rows	Figure1; Table1; SI S1, TablesS2/S7	Treatment receipt, total therapy, financial/supply channels
Does administrative change equal a move?	Atom2 unchanged-address diagnostic fractions and observation bounds	Main essential measurement paragraph; FigureS1 and TablesS5 in SI S2	Unrecognized relationships and incomplete baseline membership
Which arrangements differ at the registered horizons?	Atoms3–5 consistent endpoint dot/interval form, all nine endpoints	Figure2; Table2; complete TablesS1–S4/S6/S8	Conditional counterfactual, precision and measurement scope
What timing do endpoints conceal?	Atoms1/3/4/5 quarterly point/line profiles with ordinary pointwise intervals	Figure3 in main; SI S3 explains clocks, construction and all fixed challenges	No causal onset, slope test, recovery or simultaneity claim
Are new departures reversible?	Atom3 original-co-resident leave, sustained-away and round-trip fractions	Main residence transition; TableS9 in SI S9	No selected-leaver rate; overlapping measures, quarterly detection
Which observed events concern the same people?	Atom6 eight-pattern heatmap and joint-bound table	Figure4 and Table3; complete TablesS10–S11	No joint individual treatment effects, causal order or mediation

The [blueprint](#) fixes paragraph purposes, comparisons, scales and transitions. Scientific SI explains exact measurements, estimators, diagnostics and complete detailed results. This protocol, native appendix and [result map](#) retain exhaustive decision/activation/interpretation branches. Engineering interfaces remain in docs/execution. Conclusion-changing missingness, dependence and identification limitations remain in main text; allocation never depends on favorable results.

9. Estimands and statistical models

Let $p(c,a,j,h)$ be the registered endpoint probability in its fixed baseline population (cumulative transition or uptake occurrence, or the horizon-specific sustained-away/same-partner state), with $h=12$ or 24 months after R and events accumulated from B . $H12$ is 30 June $c+1$ and $H24$ is 30 June $c+2$. Thus these are two- and three-year windows since baseline, respectively. The primary contrast is

$$\theta_{j,h} = (p_{2021,24,j,h} - p_{2021,25,j,h}) - \frac{1}{3} \sum_{c \in \{2017,2018,2019\}} (p_{c,24,j,h} - p_{c,25,j,h}).$$

Persons receive equal weights within each of the eight cells; historical eras receive equal weights. No fitted covariate model or selective matching replaces this estimand. An event's observed lower and upper indicators equal one for a confirmed event, zero for a known absence under the registered definition, and $[0,1]$ for unresolved observation. Contrast lower bounds use lower cell bounds with positive coefficients and upper cell bounds with negative coefficients; upper bounds reverse these choices. A confirmed-record contrast and ordinary uncertainty are reported alongside the simultaneous observation interval, never presented as an unbiased complete-case estimator.

Atom 6 estimates finite-cohort shares separately in all 48 module/year/age/horizon cells. Patterns are neither, A only, B only, A before B, same observed interval, B before A, both with unresolved order, or unresolved event membership. Certified order requires no earlier unknown opportunity and nonoverlapping half-open first-detection intervals. Parenthood timing here uses first qualifying recognition, not conception or birth date. The conservative joint interval averages $L_A \times L_B$ and $U_A \times U_B$ over the same known baseline people; aggregate marginal tables cannot recover it. No model, confidence interval, treatment contrast or equality test is added for these descriptions. The residential path output follows the same descriptive convention.

10. Uncertainty, multiplicity and design sensitivity

The main family remains 20 contrasts: two uptake contrasts and nine relationship endpoints at two horizons. Missing endpoints retain their family positions. Two-sided raw and Bonferroni-adjusted p-values accompany ordinary estimates; local directional claims use simultaneous observation-bound intervals from 40 one-sided endpoints at $\alpha=.05/40$. All outcome directions are retained. No new descriptive comparison is included in that family or described as a significant effect.

Influence contributions are summed by person across index years. Two-way dependence clusters use pre-exposure connected family/partner/co-address components across index cohorts and birth year-month, with the intersection subtraction and registered finite-cluster correction. Critical values use the smaller cluster count minus one. Fewer than 30 clusters on either dimension, a largest family component above 20%, or nonpositive/nonfinite variance yields `precision_unavailable`: retain point bounds but make no direction claim. New partners or co-parents formed after baseline may create

residual dependence not removed by those clusters. No data-derived power promise is made.

Fixed bias scenarios widen the simultaneous interval by $B=0$, .01 and .02 in probability units. The latter two are hypothetical differential age-by-era bias allowances, not estimated confidence bounds on confounding, calibrated parallel trends or an application of HonestDiD. Report the breakdown bias and conditional detectable contrast from the registered formula. No finite B is empirically certified; with unrestricted differential bias there is no identified causal direction. Fixed historical gaps, baseline-to-rollout leads, age 25–age 26 contrasts, quarterly curves and three leave-one-historical-year-out contrasts challenge the design without choosing a model or sample.

11. Missingness, exclusions and competing events

Keep individual unknown follow-up inside cumulative bounds; do not require complete-case follow-up or assume missing at random. Confirmed cumulative events survive later death or exit. Death known to precede an event can close future opportunity, while prior unresolved intervals remain unresolved. Missing registration is not itself migration, separation or a death date. Optional DODSAASG documentation describes a 2022 extract vintage with historical events; only supplied and certified event periods can support death evidence, and absent optional evidence cannot certify survival beyond those periods.

Validate whole-period availability separately by outcome and horizon. Return-only historical gaps must not block departure. Inferred-pair gaps must not erase independently supported legal endpoints. Child-link history gaps block only the parenthood-dependent analyses. Unknown baseline membership is counted before exposure, outside established-denominator bounds. Record exclusion reasons and known/unknown/competing counts, retain all missing output rows, and state which population remains represented. Privacy suppression may affect export, but it must not convert counts into zeros or silently alter scientific definitions; the secure implementation must retain authorized accounting.

12. Diagnostics and rival explanations

Atom 2 uses birthdays_{24,25,26} in 2017–2019 to separate family/partner reclassification with unchanged addresses from actual identity/address changes. It records household composition changes and children aging into adult status. Confirmed artefacts demonstrate the need for the chosen outcomes; a lack of detected artefacts is not proof of complete recognition. Its native completeness criteria distinguish supported absence from partial observation.

The access module distinguishes potential new eligibility, billed standard consultations and other formats. The outcome modules preserve construction flags for parent-only moves, joint relocations, recognition-only unions, original-pair changes, widowhood, older-child links and delayed newborn recognition. Partner exposure describes spillover opportunity without estimating a partner-treatment effect. The fixed lead and age 25–age 26 comparisons can expose contradictions; passing them

cannot eliminate age-specific COVID shocks, anticipation, headspace or other policy changes, supply responses or secular cohort drift. A joint-event description identifies observed co-occurrence among known baseline people. It does not reveal whether individual treatment effects overlap, explain a marginal policy effect, or partition it among these explanations.

13. Adaptive execution schedule

Native Atoms 1,2,6 activate under TRUE. Atoms 3–5 require a completed permitted access state and completed measurement Atom 2. The permitted access states include `code_gap`, so a verified exposure design with unavailable standard-use coding does not automatically delete supported policy outcome contrasts; it restricts their interpretation. `Design_gap` or `operational no_result` closes the dependent graph route. Atom 6 independently validates its own shared measurement definitions and does not depend on exported outcomes of Atoms 3–5.

The exact activation expression shared by Atoms 3–5 is:

```
done(atom-000001) AND
((state(atom-000001) == "uptake_increase" OR
  state(atom-000001) == "uptake_decrease" OR
  state(atom-000001) == "uptake_uncertain" OR
  state(atom-000001) == "code_gap") AND done(atom-000002))
```

A completed evidenced measurement boundary can satisfy `done`; unfinished or operationally failed work cannot. Every member retains a disposition, including pending, not activated or operational no-result. Narrative order does not determine activation: the joint-description question appears after the separate trajectories in the paper but is initially active in the scientific graph. No positive outcome selects a different cohort, estimator or subgroup.

Each Atom uses its first-matching prospective result partition. For policy outcomes: no constructable endpoints gives `data_gap`; opposite B=2pp directions give `mixed_directions`; any remaining B=2pp direction gives `bounded_shift`; only B=0 direction gives `sensitive_shift`; available estimates or bounds with no resolved direction give `inconclusive`. These are conditional scientific summaries, not observed findings or causal validation. Atom 6 distinguishes established co-occurrence, completely observed absence of registered co-occurrence, incomplete overlap information and data gaps. The Molecule composes supported statements with mandatory restrictions and residual coverage, without a winner-takes-all verdict.

14. Alternative interpretations and reporting commitments

If uptake increases and some relationship contrasts are directional, report the affected endpoints and their counterfactual assumptions, while retaining financial, supply and substitution explanations. If uptake is uncertain or decreases, a relationship contrast cannot be called the effect of receiving more individual therapy. If main outcomes disagree in sign, preserve the substantive differences without assigning a net welfare score. If estimates are imprecise, report interval widths and available point bounds, not

equivalence. If measurement fails, distinguish unavailable inference from an observed absence of events.

Joint patterns remain worth describing under every access/outcome state because they address whose events coincide, rather than rescue causal attribution. Same-interval observation, unresolved order and known sequences all have distinct interpretations. Even complete absence of registered joint events cannot establish absence of within-quarter changes or a latent mechanism. Parent-linked births cannot settle long-run fertility, relationship quality or intentions. The completed paper must include all domains and conclusion-changing limitations in main text, with exact construction and complete diagnostic tables in SI.

15. Reproducibility, deviations and engineering handoff

The execution interface accepts certified normalized tables, metadata and predecessor evidence with an explicit output directory; it exports aggregate summaries and provenance, never identifiers. Duplicate/join checks precede outcomes. Metadata, dictionary periods, source/code/software and outputs receive hashes; absent certification is recorded rather than invented. The entry-point index maps every Atom to its reference implementation, required inputs and aggregate outputs. The supplied six-Atom reference implementation includes the joint and residential-path descriptions and is retained. Current synthetic checks exercise all six entry points and the quarterly renderer; their scope is recorded in the handoff. Successful tests do not certify runtime coverage or identification. Per-Atom entry points and reusable synthetic cases are indexed in [execution README](#); implementation and test status are recorded in the [handoff](#).

Synthetic verification covers timing, interval ties, unknown histories, competing events, fixed denominators, logical bounds, partition totals, exact output grids, scoped missingness and activation/direct dispatch. Synthetic inputs and checks run outside this World. Main text plus SI forms one manuscript; every planned exhibit receives a reproducible, explicitly hypothetical preview at its intended position while real result slots remain pending. The manuscript and protocol reports are compiled from their maintained Markdown sources; the handoff records actual rendered inspection. Any later scientific amendment must disclose what changed and what information was known; it may not be implemented silently in a figure script.

16. Ethics, dissemination and interpretive scope

This stage uses documentation and public literature only. Future analysis must occur in the authorized secure environment under its data access and output controls. No claim of ethics approval, linkage permission or runtime data delivery is made here. Dissemination concerns aggregate registered living arrangements and recognized family relationships, with respectful, non-normative language. The final scientific package excludes confidential rows, raw synthetic datasets, private review material and the copyrighted exemplar PDFs. Scientific uncertainty and consequential limitations remain public.

References and canonical appendix

[Literature and source record](#) lists the supporting scientific and institutional sources and access limits. [Source coverage](#) records the eight exemplar adaptations and versions. [Canonical detail](#) reproduces the current six Atom and one Molecule payloads and incorporated contracts; it supplies the technical appendix to this readable protocol, rather than a separate competing specification.

Registered protocol appendices

The preceding protocol and statistical analysis plan are the reader-facing explanation. The exact Atom protocols, local result rules, and Molecule registration below retain the executable scientific authority.

Graph overview

Dependency edges summarize the graph, not unconditional activation. Exact logical conditions and all local outcomes follow below; the separate graph atlas shows each Atom’s branches.

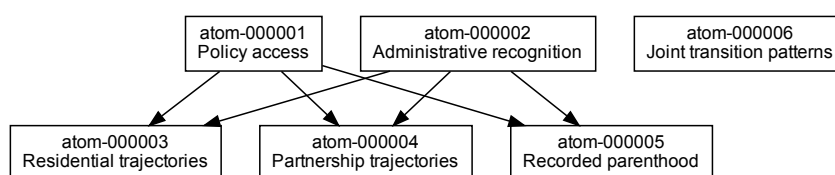


Fig. 1 Registered Atom dependencies

Literature and institutional evidence

The evidence descriptions below are inherited from the supplied six-Atom package. Earlier Blueprint/Transcriber access occurred on 8 September 2026; it is not attributed to the current editorial pass. Current independent checks are delimited in search-log.md: exact Kruse metadata, selected Gamble full-text passages, the 2021 order/agreement and DST family-type documentation. All other full-text, appendix and citation-expansion coverage below remains inherited. Sources delimit the argument; no published number is a predicted effect, power input or study result. The contribution is a connected question about observable residential, partnership and parental trajectories with careful measurement and conditional access-regime inference. No first-study claim is made.

Source	Access and relevant content	Consequence and limit
Kruse, Olsen & Skovsgaard2022, Co-payment and adolescents' use of psychologist treatment, DOI 10.1002/hec.4582	Inherited authenticated OpenAlex record W4291227777; PMC BioC full text retrieved and selected institutional, model and sensitivity passages read; backward/forward citation expansion. The baseline's complete HEC-31-92-s001.docx reading is inherited, not repeated in this editorial pass.	Closest2018 waiver study of care/health outcomes. Its age/time aggregation and first stage do not validate the2021 cohorts. Legal effective dates govern rather than shorthand age descriptions.
Serena, The Causal Effect of Scaling up Access to Psychotherapy, DOI 10.1162/REST.a.1679	Inherited OpenAlex discovery and SSRN metadata/abstract; a125-page September2024 version identified. Latest full article/appendices not retrieved. The baseline recorded publisher access failures; those are inherited, not new failures asserted here.	Broad Danish access effects beyond clinical endpoints are established research territory.2008 partial coverage is not the same entitlement contrast. Latest-appendix outcome overlap remains unresolved.

Source	Access and relevant content	Consequence and limit
Ejrnæs, Gørtz & Waltenburg2026, Reducing barriers to psychotherapy and the socioeconomic gradient in secondary education	Inherited institutional full PDF; title/opening and selected institutional pp.5–6, appendix TablesA1/A2 on pp.29–30 andA9 on p.41 inspected. Other appendix pages not represented as newly read.	Same access setting, education and GP-referral comparisons. Appendix parental separation is a baseline control, not this study’s subsequent partnership estimand. Its GP exclusion logic and broad priority wording are not adopted.
Jacobsen et al.2024, Socioøkonomiske effekter af øget adgang til psykologbehandling	Inherited public104-page PDF; front matter, selected summary and pp.31–33 placebo/interpretation discussion inspected; supplied earlier additional appendix audit is inherited.	The2018 socioeconomic placebo warning is important contrary evidence. It motivates visible age/era challenges; it is neither a relationship null nor proof that every2021 comparison fails.
Gamble et al.2011, Domain-specific social functioning improvements during treatment of depressed women with histories of childhood sexual abuse, DOI 10.1016/j.jad.2010.10.016	Inherited PMC BioC full text retrieved; selected design, intervention, measurement and limitation passages read. Individual IPT was compared with individual usual-care psychotherapy.	Existing interpersonal intervention work motivates distinct domains. The selected clinical population, active comparator and self-reported adjustment do not identify access effects on registered unions or births.
Hunsley & Lee1995, The marital effects of individually oriented psychotherapy, DOI 10.1016/0272-7358(94)00038-7	Inherited publisher-abstract audit; full review not read in this stage.	Marital consequences of individual therapy are not a new conceptual topic. No detailed conclusion from unread full text is assumed.

Source	Access and relevant content	Consequence and limit
Whisman2001, Marital adjustment and outcome following treatments for depression , DOI 10.1037/0022-006X.69.1.125	Inherited OpenAlex/PubMed abstract audit, not a current full-text read.	Comparisons among individual treatments and medication/placebo caution against attributing all pre/post marital change to individual therapy. Adjustment differs from separation.
Renner, Cuijpers & Huibers2014, Psychotherapy for depression and social functioning , DOI 10.1017/S0033291713003152; Mufson et al.2004, IPT for depressed adolescents , DOI 10.1001/archpsyc.61.6.577	Inherited primary-abstract/OpenAlex audits. No new full-text or meta-analysis reconstruction.	Controlled social-functioning research provides intervention precedent, not expected Danish household effect sizes.
Halidu et al.2024, Social anxiety and first timing of parental home leaving and living with a partner , DOI 10.3389/fpubh.2024.1484501	Inherited selected PMC full-text audit.	Closest residential/union outcomes, but adolescent anxiety is not assigned psychotherapy access. Association does not fix the sign or magnitude here.
Mackrill2008, Pre-treatment change and leaving home , DOI 10.1080/14733140802193341; Wu & Grundy2023, Boomerang moves and mental well-being , DOI 10.1016/j.alcr.2023.100531	Inherited institutional/indexed abstracts only.	Residence changes can precede treatment seeking; returns need not have a uniform welfare meaning. These are temporal/welfare cautions, not policy-effect estimates.

Source	Access and relevant content	Consequence and limit
Lolk et al.2024, Depression and family dissolution , DOI 10.1016/j.jad.2024.01.022	Inherited public-main-paper methods audit; separate supplement unresolved.	Danish dissolution is established subject matter. Depression proxies and family-ID-based annual measurement do not define the psychotherapy-access estimand.
Poulter et al.2026, Self-guided psychotherapy for infertility distress , DOI 10.1093/humrep/deaf237; Snapper et al.2018, Individual psychotherapy and pregnancy outcomes , DOI 10.1016/j.jad.2018.05.083	Inherited selected full-text audits; no new independent full-paper assessment.	Infertility-selected self-guided intervention and already-pregnant clinical cohorts cannot justify predictions about incident parenthood in this population. Parenthood remains a justified domain with narrower claims.

Primary policy evidence retained from the earlier source audit comprises [Order264 of25March2018](#), [Order989 of25September2019](#), [Order1213 of1June2021](#), the [July2021 agreement](#) and the [December2021 permanent-financing agreement](#). The baseline's citation date for Order264 was corrected; the effective July2018 exposure date did not change. Clinical/referral criteria and continuation after25 prevent a sharp withdrawal interpretation. The [December2020 announcement](#) provides a known anticipation date, not proof that no earlier information existed.

Inherited [DST FAMILIE_TYPE](#) and [FAMILIE_ID](#) documentation corroborate the under25 family-classification trap and the distinction between legal, common-child and algorithmically inferred couples. Some documentation also discusses older C-family definitions; those older rules must not silently serve as current E-family codes. The inherited [E_FAELLE_ID](#)/service-fee audits and copied schema guide the mandatory dated-dictionary validation, not an assumption that dictionaries or full histories have been delivered.

The baseline's SU course-start and family-reunification age-rule sources remain relevant competing-policy cautions in the identification contract. Their complete historical application and exemptions remain unresolved. Current citizenship categories cannot remove migration/cohort confounding. Neither a restricted literature search nor the lack of an exact matching title proves novelty or availability.

Data contract

Version 1, 8 September 2026. Only public schema/documentation was read. The supplied 47-table allowlist is preserved in `docs/sources/data-boundary.yaml`; no table is validated. The design uses BEF and SSSY, with optional DODSAASG solely in its supplied, documented period. It does not require AMRUN, hospital data, education, prescriptions, income or employment. No physical mount is asserted.

Table and exact fields	Unit, clock and join	Version and unresolved delivery requirement
BEF: PNR, FOED_ DAG, REPERENCETID	One person per reference snapshot; encrypted person key. Age is completed calendar years on 1 July, calculated from date of birth.	Require stable person keys and actual reference dates; do not assume a dataset suffix is an observation date. Birthdate must be invariant.
BEF: ADRESSE_ID, BOP_VFRA, MOR_ID, FAR_ID	Self-join each baseline-linked legal parent to PNR at the SAME snapshot, at most two parent matches. Compare addresses, not family membership.	Address keys must be comparable across persons and time. BOP_VFRA is residence-validated from corroboration, never a complete event history. Parent links may be adoptive/legal and do not cover every caregiver.
BEF: AEGTE_ID, E_ FAELLE_ID, CIVST, CIV_VFRA, FAMILIE_ TYPE, FAMILIE_ID, PLADS	Spouse and recognized partner identities joined at each snapshot; require reciprocal nonself pair links and compatible addresses. Civil dates support legal events only.	Delivered, dated civil-status and family-type value labels are required. No guess about historical 1/2 versus 7/8 meanings. FAMILIE_ID/PLADS are diagnostic comparators only.
BEF: KOEN, KOM, STATSB, SENESTE_ INDVANDRING	Baseline descriptive composition; municipality is fixed at baseline for comparisons.	Labels and administrative-code harmonization are runtime documentation requirements. No post-policy adjustment. Missing context remains a category, never a reason for dropping a person.

Table and exact fields	Unit, clock and join	Version and unresolved delivery requirement
BEF child rows: PNR, FOED_DAG, MOR_ID, FAR_ID, REFERENCEID	Invert child-to-parent links; one child may link to two parents; deduplicate child identity within a parent's history, not across parents.	All resident child rows, including those at other addresses, are needed. This is recorded legal parenthood, not biological fertility or exhaustive first birth.
SSSY: PNR, SPEC2, SPECIALE, HONUGE, AFRPER, YDLANT, YDERNR, VERSION, KONTAKT	Billed-service records, potentially multiple per person/week/provider/service. Aggregate only after delivery-specific reversal/version handling. Many services join one cohort person.	SPECIALE is six digits (two specialty + four service); SPEC2 63 is psychologist help. HONUGE is fee week, not referral. Confirm full year/week encoding and year-boundary rules. AFRPER is settlement period, not treatment date; KONTAKT is a derived contact marker. YDTYP is provider type, not a consultation-modality field.
DODSAASG: PNR, D_DODSDATO	Optional one death date per person; exact duplicates collapse, contradictory dates fail.	The catalogue describes an event register covering 2002–2022; DODSAASG2022 is the extract vintage, not a restriction to deaths in 2022. Require a delivery certificate for every event period used; no coverage after 2022 is inferred. Absence of a row proves no death only within a certified complete delivery period.

Exact retrieval: `resources/schema/data-registry-bolero/fsv/population-and-elections/BEF.md`, `fsv/living-conditions/SSSY.md`, and the exact DODSAASG FSV page; source URLs and field rows are retained in `docs/sources/retrieval/schema-evidence.md`. TIMES consulted narrowly: `times/social-conditions-health-and-the-justice-system/health-insurance-statist`

`ics.md` and the entries SPECIALE, SPEC2, KONTAKT, HONUGE in the cross-cutting social/health module. The catalogue's spans (BEF to June 2026; SSSY to 2025) are documentation, not delivered histories or identifying variation. No catalogue observation count is an analysis sample size.

Cohorts, clocks and fixed risk sets

For index year c in $\{2017, 2018, 2019, 2021\}$, define rollout clock $R_c = 1$ July c and baseline $B_c = 30$ June $(c-1)$. Primary age bands are completed ages 24 and 25 on R_c ; age 26 supplies a registered negative-control age comparison. For $c=2021$, age 24 corresponds to birthdates 2 July 1996 through 1 July 1997, inclusive. These persons were already at least 21 on 1 July 2018 and at least 22 on 1 October 2019: they had no entitlement under the earlier waivers. Ages 25 and 26 were also never entitled. This claim concerns the index person, not younger partners or other household members.

Include residents observed at B_c with valid invariant birthdate and a nonmissing person key. Do NOT require residence or survival at R_c or any later date. Do not select on clinical diagnoses, referrals, psychotherapy, moving, union formation or subsequent birth. No sex restriction. One person can contribute to more than one historical cohort; retain and account for this dependence. All denominators are fixed at baseline. The cohort represents baseline registered residents, not all clinically eligible patients.

Baseline relationship risk sets are independently defined; overlap is permitted. Co-resident means sharing a nonmissing address with at least one baseline-linked observed parent. Away means all baseline-linked parents have known, different addresses at each of the four snapshots ending B_c ; at least one parent link is required. Other parental states are unresolved, not away. Unpartnered means no reciprocal recognized co-resident partner at B_c and the preceding snapshot; it does not mean no romantic relationship. Partnered means the same reciprocal, recognized co-resident person at both snapshots. Legal entry/dissolution risk sets use dated civil status and spouse identity at B_c . Recorded nonparent means no observed child-to-person parent link in the five December snapshots preceding B_c , the four quarters ending B_c , or B_c itself, with all specified population snapshots supplied. This is five-year observed history, not lifelong nonparenthood. Never label that endpoint true first parenthood.

Minimum main follow-up is through 30 June $(c+2)$, with every intervening quarter from baseline, plus two quarters for newborn-link confirmation; the latest required child snapshot is 31 December 2023. Horizons $h=12, 24$ mean 30 June $(c+1)$, 30 June $(c+2)$. Events are accumulated from B_c , so anticipation and pre-rollout transitions stay in the fixed denominator. The policy-regime interpretation includes anticipation; it is not an effect conditional on being at risk in July 2021. Quarterly diagnostic curves use each quarter from baseline to the endpoint, labeled months relative to July rollout. No interpolation of exact move dates.

Coding and validation

The October 2021 official fee schedule documents standard individual first/follow-up consultation codes 0110/0111, 0210/0211, 0410/0411 (ordinary trauma, ordinary anxiety/depression, waived anxiety/depression respectively); double consultations 0141/0142, 0241/0242, 0441/0442 and video 0119/0219/0419 are separately labeled. Two-person 0120/0121, 0220/0221, 0420/0421 and group 01/02/04 prefixes with suffix 23–29 or 33–39 are NOT standard individual consultations. Codes 0106/0206/0406 are advice; 0118/0218/0418 are erroneous-referral/no-course; 0214/0215/0414/0415 are erroneous-referral contacts. These are not the primary uptake definition. Primary uptake is ANY billed standard individual first/follow-up consultation (the six 10/11 codes), across all indications and copayment regimes, within each horizon. This avoids mislabeling a transfer from paid to free billing as treatment initiation. It does not count independently coded video, advice, double, conjoint or group services as the primary six-code margin; their fixed-format shares are descriptive checks.

The January 2022 agreement retires 02xx ordinary codes and uses 01xx on the ordinary scheme; 04xx remain for free treatment. The schedule above is documentary evidence for its stated vintage, not authorization to back-cast to 2016. Before estimating uptake require an externally documented effective-date crosswalk covering each period required by that cohort and horizon between 2016 and 2023, including 2020 emergency remote formats, and the delivered SSSY encoding. A dated runtime mapping may supply the same semantic categories; changed scientific meaning is an amendment. Unverified vintages block only contrasts requiring them, never zero uptake. A later unsupported vintage cannot suppress an independently supported earlier horizon; code_gap requires neither main uptake horizon to be constructable for service-related reasons. Exact positive counts require YDLANT>0 after certified cancellation/revision handling; ambiguous negative adjustments or duplicate billing versions block uptake. Do not use BEHANDLINGSDATO (unlabeled, only catalogued from 2021) to change the clock across eras.

Freeze a governed metadata JSON before outcomes: table/field/delivery inventory, snapshot dates, key namespaces, dictionary URLs and checksums, civil/family value maps with effective dates, complete billing periods, HONUGE-to-Monday map, documented empty versus undelivered tables, address comparability and registry corrections. These are verification inputs, not user-filled favorable-validity flags. Code asserts unique person/snapshot; exact duplicated full rows may collapse with a count, conflicting rows never select an arbitrary record. Person birthdates must agree across snapshots. Parent/partner joins are many-to-one per key/date; reciprocal conflicts are unresolved for that construct, not repaired using outcomes. A missing entire cohort-quarter is a data gap for that horizon; individual absence is retained as an unresolved registration exit. Never silently shorten follow-up or change historical years.

Observation and competing events

For every endpoint, carry event_lower,event_upper in [0,1]. A confirmed event is [1, 1]. A fully observed non-event is [0,0]. An unascertained potentially relevant interval is [0,1], unless an earlier confirmed event fixes cumulative incidence at one. Do not

carry forward a missing address, spouse or parent as a known state. Known death before a target event is a competing event, not separation/departure; a subsequent confirmed event cannot occur after death. CIVST widowhood provides a specific legal event, not a general mortality date. A disappearance without dated certified death or migration evidence is an unresolved exit; known migration and death are reported separately wherever supplied evidence supports them. No censoring-at-exit estimator, missing-at-random weighting, or eventual-survivor restriction is allowed.

For residence, a parental disappearance/death before a potential transition makes parent-comparison meaning unresolved; it never creates a departure. Parent movement alone cannot be the young person's leaving/returning. For baseline recognized dyads, only death of an original member or an identity- and date-matched widowhood transition competes with separation; uncertain exit of either member creates [0, 1]. Parenthood observed at a newborn's first eligible snapshot is recorded parenthood, so unregistered births/deaths between snapshots remain a construct limitation even when table delivery is complete. Five-year nonparent history cannot establish lifetime childlessness or absence of children abroad.

Machine outputs and row-level intermediates stay governed. Public World contains schemas, code, labeled aggregate mock previews and pending result bindings only.

Component-specific validation and event identities

The native Atom protocols own the exact registered rules. Validate parental-address outcomes independently of the return lookback, and legal outcomes independently of recognized-pair histories. Only the affected outcome/horizon loses support; retain supported components and list every missing component in `component_gaps.csv`. The four baseline censuses and ages24/25 in each are common policy prerequisites, before service availability is adjudicated. A certificate that SSSY is absent cannot establish that those censuses exist.

For baseline-union dissolution, preserve the original spouse identity. Widowhood/death closes that union's new dissolution opportunity permanently; a different later union's divorce cannot count. A confirmed dissolution preceding death stays confirmed. Newborn eligibility uses the child's birth window but confirmation uses the first legal-recognition snapshot, which must precede the index person's documented death. Pre-death birth recognized after death, and birth dated after death, have separate ascertainment flags and are excluded from confirmed recorded parenthood. This definition intentionally avoids retrospective biological-parenthood assumptions. Persons remain in their fixed denominators and earlier unknown intervals remain unknown.

Diagnostic denominators require established pre-birthday risk membership; unknown baseline addresses/family IDs/recognition are separately counted as `baseline_unknown`. Follow-up unknowns retain `count/n` and `(count+unknown)/n` bounds within that denominator. Sampling intervals are unavailable with incomplete ascertainment or year coverage. The separate `diagnostic_coverage.csv` enumerates all 2017–2019 year/age/component cells, including missing birthday brackets. Lack of detected artefacts cannot establish coverage.

Scoped unknown membership and service windows

Validate a service row’s dated dictionary only after assigning its cohort-specific fee-week window. A later unrecognized code is a boundary for horizons containing it; it cannot invalidate an earlier certified window. Unmapped relevant fee weeks remain a boundary because their timing is unknown. Unknown partner/civil membership is not a zero partner count. Descriptive partner/flag products expose `baseline_unknown`, status and reason; partial means established subset only, `data_gap` means wholly unresolved, and descriptive zero requires verified emptiness. These refinements apply to aggregate tables as well as primary estimates.

Exact meaning of the standard consultation codes

The primary category is `standard_individual`: use recorded under the six individual first/follow-up consultation codes. The agreement revised 29 August 2019, §4(3), permits home-visit supplements to these consultations. The October 2021 fee schedule also lists telephone registration marker 1011. Accordingly this category establishes neither office location nor modality. No encounter matching is inferred from common fee weeks, and supplemental/administrative rows outside the registered consultation categories remain unclassified with their dated meanings recorded. Independently coded double/video/advice/two-person/group use is described separately. The earlier agreement §3(6) also allows double consultations billed using consecutive individual codes, so this separation is a separation of billing categories, not a universal duration classification. The six-code primary comparison is unchanged; historical code applicability remains a runtime requirement.

The optional death metadata uses `death_periods` with start, end and source. DODSAASG2022 names the extract; its documented event scope is 2002–2022. The Registry validates supplied death rows against actual certified periods, never a blanket “2022 only” rule. Missing certification or an out-of-certificate row requires a scoped governed adapter and `no_result`; absent optional death data do not imply survival. The 2023 follow-up can therefore retain unresolved exits.

Recognized partner and legal spouse are separate baseline identities. A dated widowhood transition is evidence of the original recognized partner’s death only when the immediately preceding legal status and spouse identity identify that same person. Pre-existing widowhood and death of a different spouse cannot close the recognized pair. If identity/date cannot be matched, record the unresolved attribution; directly observed addresses still establish co-residence or separation. The legal-union rule continues to follow the original legal spouse.

Identification, theory and analysis contract

The single question is whether a psychotherapy copayment-access expansion changes young adults’ subsequent registered residential, partnership and parental trajectories. The target exposure is a policy bundle, not therapy received. All descriptions of identification below are prospective assumptions; no first stage or parallel trend has been observed.

Institutions and chosen variation

Effective/public date	Verified rule and design implication	Primary source
1 July 2018	Free care for 18–20-year-olds with mild/moderate anxiety or depression under the referral scheme; previous subsidy 60%.	Order 264 of 25 March 2018, §§4(5),6; Danish Regions announcement.
1 October 2019	Additional 40% subsidy extended through age 21. September is issue/publication timing, not the legal effective date.	Executive Order 989 of 25 September 2019, §§4(5),6.
6 December 2020	Public announcement of permanent scheme and expansion to 18–24 from second half 2021; nationwide headspace expansion also announced.	Ministry financing announcement. Earliest public anticipation is not exhaustively established.
1 July 2021	Waiver through age 24 under clinical/GP-referral conditions. Existing patients aged 22–24 transfer; courses may continue after 25 to completion or agreement expiry.	Order 1213 of 1 June 2021, §§1–4,6; RLTN–DP agreement dated 4 July 2021, §§2,4.
1 January 2022	Permanent financing agreement and code restructuring; continued free courses after age 25 explicitly retained.	RLTN–DP agreement signed 17 December 2021, §§1,3,4.

The 2021 Order requires GP referral before starting treatment (received within three months), qualified depression/anxiety and a contracted psychologist. Up to 12 consultations plus up to 12 after rereferral are possible; individual, two-person and group formats are permitted. New-referral entitlement days at age 24 are the interval [1 July 2021, 25th birthday), not a fixed year’s treatment. Existing courses can outlast this interval. Neither days eligible nor fee weeks reveal actual referral timing. Include existing users and zero users. The main age-24 versus age-25 contrast is adjusted by the mean corresponding age gap in the fixed historical index years 2017, 2018, 2019.

Younger 2021 ages 22–23 are not pooled because of earlier entitlement. The historical cohorts' index persons are too old for the waiver throughout their registered follow-up.

A 2018 comparison was not chosen as the central design: subsequent entitlement and age-specific education/housing changes complicate its longer follow-up. The 2021 contrast avoids prior waiver for index persons and uses adjacent ages; it does not solve COVID, cohort drift or partner exposure. No birthday RDD is registered: cumulative exposure approaches zero near the new-referral cutoff and continuing courses defeat a sharp withdrawal model. No GP IV is registered: GP identity/referral style is not established as an excluded instrument within this boundary. No treatment LATE is registered: copayment savings, existing-user transfers, other formats and provider responses violate an unqualified therapy-only exclusion claim.

Theory and competing explanations

Individual treatment could change avoidance, planning, tolerance of conflict, or capacity to manage shared/separate living. A parental home can provide insurance and support; treatment could facilitate departure, sustained residence elsewhere, or a considered return. Household matching and relationship-specific investments make entry and continuation different decisions. Increased agency could yield either continuation or exit. Parenthood timing may change through perceived capacity and resources, but neither intentions nor conception are observed. These are author-proposed rival pathways, not tested mediation equations.

The same policy can alter available money directly, move private services onto public billing, change provider capacity and waiting, or crowd out older patients. Partner/family access may change jointly with index-person eligibility. Therefore the contrast is the differential effect of the implemented age-targeted regime, including its financial and equilibrium components, under assumptions about differential spillovers. It is not the effect of national rollout versus no rollout, because the comparison group can also be affected. No household success index or welfare sign is assigned.

Estimator and uncertainty (incorporated by every effect Atom)

For endpoint j and h in $\{12,24\}$, let $p[c,a,j,h]$ be its baseline-denominator probability for age a at rollout and index year c . Set $G[c,j,h]=p[c,24,j,h]-p[c,25,j,h]$. The registered contrast is $\theta[j,h]=G[2021,j,h]-(G[2017,j,h]+G[2018,j,h]+G[2019,j,h])/3$. Every cell gives each member equal weight, each historical gap receives weight $1/3$. No covariate selection, bandwidth optimization, individual TWFE or selected transition hazard. The same formula applied at quarterly endpoints $-9,-6,-3,0,3,6,9,12,15,18,21,24$ months relative to July rollout describes the fixed descriptive trajectory curves; values at or before 0 are leads; these are not hypothesis-selection tests.

Compute the confirmed-event contrast from lower endpoints and the sharp worst-case missingness bounds for this linear contrast: for each positive cell coefficient use p_lower for the lower bound and p_upper for the upper; reverse this choice for negative coefficients. Provide all eight cell denominators, confirmed events, unknowns and known competing events. The bound is about these registered states under missing observation, not comprehensive romantic life or fertility.

Influence contribution for a cell mean is $(y_i - \bar{y})/N_{\text{cell}}$ times its fixed contrast coefficient. Sum contributions for a person across repeated cohorts. Form scalar two-way cluster covariance $V_{\text{family}} + V_{\text{birthmonth}} - V_{\text{intersection}}$, with finite-cluster $G/(G-1)$ factors. Family clusters are connected components over the union of baseline parent, recognized-partner and co-address links across all included index cohorts (do not add post-baseline links). Birthmonth cluster is calendar birth year-month of the index person. This conditions on negligible remaining dependence across distinct baseline family and birth-month clusters. Newly formed co-parents/partners can violate that approximation; bias widening does not repair variance misspecification. It accounts for observed baseline kin/household dependence and cohort-correlated shocks; it does not identify uncertainty from an arbitrary national age-specific shock. Report both cluster counts, largest family share and nonpositive variance failures. Fewer than 30 clusters in either dimension, largest component $>20\%$, nonpositive variance, or nonfinite variance: retain cell probabilities/point bounds but mark precision_unavailable and make no interval-based direction claim. Thresholds are conservative author engineering/inference restrictions, not validity theorems.

The family comprises 20 planned comparisons: two standard consultation uptake horizons plus nine relationship endpoints at two horizons. Each lower/upper bound uses one-sided $\alpha=0.05/40$ with t reference degrees of freedom $\min(G_{\text{family}}, G_{\text{birthmonth}}) - 1$. This gives Bonferroni coverage across 40 endpoints conditional on the cluster approximation. Report ordinary two-sided 95% intervals for the confirmed-event contrast and raw p , plus $p_{\text{bonf}} = \min(1, 20 \cdot p)$; directional claims use bound intervals, not raw p . Missing tests remain in 20. No equivalence/SESOI region is claimed: a defensible cross-domain negligibility threshold is unavailable. Report the interval, not a power assertion or scientific null. The design-sensitivity display reports the half-width and hypothetical detectable contrast (critical value plus $0.8416 \times \text{SE}$, explicitly conditional precision, never anticipated sample size.

Parallel age-gap transport is untestable. Report confidence sets widened by fixed differential-bias allowances $B=0, 0.01, 0.02$ (probability units; 0,1,2 percentage points). Subtract B from lower and add B to upper. This elementary bounded-bias analysis assumes $|\text{age-specific counterfactual drift} + \text{differential non-target policy/spillover bias}| \leq B$; it is NOT an implementation of HonestDiD, an estimated bound, or proof $B=2\text{pp}$ is credible. No finite B has been empirically justified. Give the breakdown $\max(0, \min(|L|, |U|))$ if the $B=0$ bound interval excludes zero, otherwise zero. The unbounded-bias conclusion remains unidentified regardless of sign.

Ordered common checks and registered sensitivities

1. Establish tables, dates, keys, code vintages, baseline risk sets and household clusters; record each failure at its narrowest affected endpoint/horizon. Do not stop unrelated supported outcomes.
2. Reconstruct entitlement days 2018 onward for all index ages; verify zero earlier waiver for primary people. Describe baseline partners' ages and entitlement days without adjusting for post-policy partner choice. Check billing changes and transfer-versus-use distinction.

3. Tabulate baseline composition by age/era (sex codes, municipality, observed immigration date, parent/partner recognition, recorded child history); no p-value-based balancing or dropping. Zero-denominator cells make that contrast unavailable, not zero.
4. Estimate ALL fixed main outcomes/interval bounds. Provide age gaps separately in 2017,2018,2019 and 2021, lead gaps from baseline through June before rollout, and the age-25 versus age-26 negative-control contrast with the identical era weights. These challenge outcome-specific age/cohort stability; their failure cannot be erased by a stronger first stage.
5. Publish fixed B sensitivity sets and unknown-event bounds. Also publish leave-one-historical-year-out contrasts (2017,2018,2019 each removed once) as descriptive specification checks with ordinary conditional intervals. Never choose the favorable subset as main. Partner/capacity spillovers and the contemporaneous headspace expansion remain threats even if these comparisons are stable.
6. Adjudicate endpoint statuses, then integrated Atom states. A shift survives B=2 only as a CONDITIONAL bounded-bias statement; a conflicting negative control/lead is reported in the main narrative and precludes an unqualified policy attribution. No statistical diagnostic certifies the counterfactual.

The September2020 lead precedes the verified6December2020 announcement, whereas December2020 and later pre-rollout observations may contain anticipation. A resolved later lead can be an anticipatory policy response as well as differential drift; it is not an untreated falsification by definition. The full fixed sequence is shown without choosing an announcement-free subset after outcomes. Earliest-announcement uncertainty remains explicit.

No outcomes select downstream endpoints, age bands, years or estimators. Activation depends on acquisition/measurement states and the completed access assessment; positive uptake is not necessary for reporting policy contrasts. Diagnostics from the same outcomes do not filter reported tests. Interpretive state selection uses the simultaneous sets, and all members remain visible. Any unregistered data-driven specification is a timestamped exploratory extension, outside this closed graph.

Primary source locators and unresolved policy audit

- <https://www.retsinformation.dk/eli/lta/2018/264/pdf>
- <https://www.regioner.dk/services/nyheder/2018/juli/nu-faar-18-20-aarige-gratis-psykologhjelp/>
- <https://www.retsinformation.dk/eli/lta/2019/989/pdf>
- <https://www.ism.dk/nyheder/2020/december/forsoegsordning-med-gratis-psykologbehandling-til-unge-bliver-permanent-med-finansloven>
- <https://www.retsinformation.dk/eli/lta/2021/1213/pdf>
- <https://www.ft.dk/samling/20201/almdel/suu/bilag/544/2435735.pdf>
- https://www.dp.dk/wp-content/uploads/2022/01/POK-Endelig-tillaegsaftale_vederlagsfri-psykologhjelp.pdf
- <https://www.dp.dk/wp-content/uploads/2021/12/praksishonorar-oktober-2021.pdf>

The supplied baseline recorded access on 8 September 2026, including October fee rows. That earlier Blueprint independently rechecked the core orders and 2021 agreements. The current editorial pass rechecked the 2021 order/agreement and family-type documentation; current versus inherited access is distinguished in docs/sources/search-log.md and literature.md. June 2020 baseline predates the verified announcement, but no exhaustive earliest-announcement finding is claimed. The supplied preliminary audit did not establish an earlier date; this is not proof of absent anticipation. If dated evidence places relevant anticipation before baseline, the frozen effect target becomes design_gap; do not move baseline after looking at data.

Official SU historical rates confirm the July 2014 course-start rule (<https://www.su.dk/satser/videregaende-uddannelser-satser-for-su-til-hjemmeboende/gamle-satser>); no education histories are authorized to remove this cohort confounding. The 24-year family-reunification requirement is a specific competing age rule (official FA1 form, https://www.nyidanmark.dk/-/media/Files/US/Application-forms/Fam-sam-1-gang/fa1_en.pdf); its complete historical application and exemptions remain unresolved. Birth/cohort migration differences cannot be cured by current citizenship adjustment. These unresolved threats limit all causal readings. The VIVE warning is taken seriously rather than presumed inapplicable because the present outcomes differ.

Registered deterministic checks preserve the original comparison. Entitlement validation runs before service construction and verifies all primary baseline age cells. Boundary-week sensitivity excludes closed Monday–Sunday weeks containing B, R or H; it retains its own diagnostic selector and never replaces primary uptake. Baseline partner descriptions classify age at R and any actual-policy entitlement days before R and from R through H12 into the fixed age/history strata registered in atom-000004. Dyads count once per baseline cohort and relation; person-average effects still include both eligible index people, with the registered clustering. The descriptive exposure and flag products do not add confirmatory tests or choose a preferred model.

Scientific authority and execution

The current editorial Blueprint starts from the supplied unexecuted six-Atom Blueprint/Transcriber package. Native Atoms retain their IDs, activation and local result partitions; Molecule membership retains every Atom and owns the storyline and composable interpretation. Shared data/identification contracts are incorporated into native protocols. This revision adds explicit bindings for already registered quarterly displays and clarifies the existing joint-event claim limit. It introduces no new estimator, outcome family, subgroup, threshold or branch. See [amendment](#).

Only public documentation, scholarly sources and the supplied design/code were accessed. No confidential rows, study outcome summaries or real sample sizes were inspected. Earlier project knowledge is not retroactively erased, and historical assessment of an earlier baseline does not approve later additions. No registry deposit or scientific acceptance is asserted.

Transcriber owns reference-code reconciliation and testing, the revised quarterly renderer, complete determined manuscript prose, labeled mock exhibits, both compiled reports and rendered inspection. It preserves this scientific handoff. Missing scientific inputs or source choices retain their registered scope; they are not filled by a fixture, renderer or new analysis. Graph and direct dispatch obey the native scientific prerequisites.

Every analysis, unsupported component, inactive route and operational failure retains its reporting disposition. No-result is not a scientific null; no raw p-value substitutes for the registered interval rule. Any later scientific amendment records its time, reason and knowledge history before implementation. No review transcripts, earlier builds, private data, raw synthetic fixtures, exemplar PDFs or detailed QA logs enter delivery.

Execution supplement

Six-Atom reference execution

This implementation follows the final six native Atom protocols and [scientific interfaces](#). It preserves the original effect analyses and implements the added residential descriptions and independent joint-transition experiment. All empirical results remain pending.

The Atom registrations and shared data/identification contract are scientific authority. `reference.py` implements cohort/risk-set construction, person/parent/partner joins, service coding, quarterly endpoints, sign-correct missingness bounds, fixed age-by-era contrasts, cluster inference, multiplicity, bias scenarios, diagnostics and state adjudication. No empirical data are included. The functions accept DataFrames; the command-line loader accepts governed Parquet. Python, pandas, numpy, scipy, PyYAML and matplotlib are required; pyarrow is needed only for Parquet loading. Tested package versions and actual coverage are recorded in the handoff.

Atom	Entry point in reference.py	Required inputs	Products
atom-000001	run_atom	BEF, SSSY; dated standard individual service dictionary, fee-week mapping, net-final billing extract and period inventory; documented policy chronology	exposure.csv, formats.csv, boundary_ week.csv, effects.csv, cells.csv, diagnostics.csv, disposition.json; code_gap retains exposure and NA uptake rows

Atom	Entry point in reference.py	Required inputs	Products
atom-000002	run_atom	BEF full contemporaneous person/parent/partner addresses, family/civil dictionaries and snapshot inventory	diagnostic_ rates.csv, diagnostic_ coverage.csv, disposition.json
atom-000003	run_atom	BEF parent/address histories, documented policy chronology; optional certified DODSAASG dates	effects.csv, cells.csv, diagnostics.csv, residential_ paths.csv (48 rows), disposition.json
atom-000004	run_atom	BEF reciprocal recognized partners, spouses, civil dates and time-valid dictionaries; optional death dates	effects.csv, cells.csv, diagnostics.csv, disposition.json
atom-000005	run_atom	BEF index and full resident-child histories; fixed prebaseline and newborn-confirmation snapshots; optional death dates	effects.csv, cells.csv, diagnostics.csv, parenthood_ ascertainment.csv, disposition.json
atom-000006	run_atom / joint_products	BEF full resident/parent/partner/child histories and effective family dictionary; civil and optional death evidence where available; no policy or SSSY prerequisite	joint_patterns.csv (384 rows), joint_ bounds.csv (48 rows), component_ gaps.csv, disposition.json

Every numbered template below calls the actual common implementation, preserving the signature `run_atom(atom, tables, metadata, *, states=None, terminals=None, dispatch='graph', output=None)`. Commands run from the copied execution source directory; substitute the governed input directory and a distinct writable output directory.

Atom	Numbered source and exact command
atom-000001	<code>python -B 01-policy-access-template.py --input INPUT --output OUTPUT</code>
atom-000002	<code>python -B 02-recognition-template.py --input INPUT --output OUTPUT</code>
atom-000003	<code>python -B 03-residential-trajectories-template.py --input INPUT --output OUTPUT</code>
atom-000004	<code>python -B 04-partnership-trajectories-template.py --input INPUT --output OUTPUT</code>
atom-000005	<code>python -B 05-recorded-parenthood-template.py --input INPUT --output OUTPUT</code>
atom-000006	<code>python -B 06-joint-transitions-template.py --input INPUT --output OUTPUT</code>

Append `--dispatch direct` only for explicit direct dispatch. The shared `reference.py --atom atom-NNNNNN CLI` is equivalent. It reads only caller-supplied BEF/SSSY/optional DODSAASG Parquet and metadata/predecessor JSON; no physical data mount is guessed. No production module imports hypothetical preview generators.

`test_reference.py`, `test_observation_semantics.py`, `test_scoped_boundaries.py`, `test_provenance_and_pairs.py` and `test_joint_and_paths.py` exercise actual analysis construction with in-memory inputs. Run `PYTHONDONTWRITEBYTECODE=1 python -B -m unittest test_reference test_observation_semantics test_scoped_boundaries test_provenance_and_pairs test_joint_and_paths -v` from the copied source directory. This command covers all six Atoms. `test_portable_dispatch.py` additionally runs all six numbered CLIs against temporary Parquet inputs, binds the executed synthetic predecessor dispositions, compares graph/direct joint outputs and checks a separate read-only World remains unchanged. Run it with `python -B -m unittest test_portable_dispatch -v` from the copied source directory. Full discovery also runs the current figure interface adapter; when analysis code is copied independently, set `BOLERO_WORLD_DIR` to the separate read-only World and `BOLERO_TEST_OUTPUT` to an external writable test directory. Temporary inputs and test outputs never belong in the World.

Runtime certification of delivered coverage, historical meaning, billing corrections, source provenance and optional mortality remains necessary even after synthetic tests pass.

From a copied writable code directory:

```
python reference.py --atom atom-000003 --input
↳ /governed/data/shared/registered-input --output
↳ /governed/data/outputs/residential
python reference.py --atom atom-000003 --input
↳ /governed/data/shared/registered-input --output
↳ /governed/data/outputs/direct-check --dispatch direct
python -m unittest discover -s . -p 'test_*.py' -v
```

Substitute the runner's declared input/output locations, including BOLERO_OUTPUT_DIR/BOLERO_DOCS_DIR when supplied. The World is read-only; copy these sources to the D3 code/analyses/ area. Each invocation writes only its named products and never clears shared data. Use separate run output directories for retained runs. The caller passes the selected Atom; no random planner selects a scientific branch.

tables is a dict keyed BEF, SSSY, optionally DODSAASG. Original documented column names are retained; encrypted IDs must be normalized consistently to strings by a documented mechanical adapter. Empty certified tables differ from absent invocation inputs. metadata.json has (all empirical eligibility must be certified before execution):

- **bef_dates**: actual delivered reference dates, including explicitly certified empty population snapshots. Each observation uses its validated REFERENCEID, not a filename-derived clock.
- **sssy_unavailable_evidence**, only when a delivery audit establishes the missing service history. Missing SSSY invocation input without this evidence produces no_result, not code_gap.
- **policy_sources**: dated source locators; **earliest_relevant_announcement**: audited documentary date, with any incomplete search qualification. The comparison fails if this predates the fixed baseline. This metadata is a documented claim, not evidence that age-specific shocks are absent.
- **family_dictionary** and **civil_dictionary**: records code, meaning, valid_from, valid_to, source, source_sha256. Allowed meanings are the protocol's recognized types and civil states. Missing definitions leave the affected construct unresolved. Same-sex unions are never fabricated from opposite-sex inference.
- **service_dictionary**: records four-digit code, semantic meaning, valid_from, valid_to, source, source_sha256. Allowed semantic keys: standard_individual, double, remote_advice, two_person, group, unclassified. Primary standard consultation code semantics are separately constrained. **service_dictionary_periods** certifies exhaustive vintage coverage with start/end/source. This must cover even periods with no observed use.
- **fee_week_map**: raw HONU string to its officially decoded fee-week Monday. **billing_periods**: certified complete start/end intervals. **billing_revision_**

`rule='net_final_extract'` means a documented adapter has resolved cancellations/revisions before this analysis; other rules require an operational adapter and `no_result` until supplied. Preserve audit provenance, source fields and row counts. A field's presence is not evidence of correct mapping.

- Optional DODSAASG input must be certified for its actual supplied period. Absence outside it never proves survival. No migration source beyond documented BEF history is invented; unresolved disappearance remains unknown.

`predecessors.json` contains **states** (realized Atom local states) and **terminals**. `Atoms1,2,6` are independently active. For executed graph routes3–5, `meta-data.predecessor_evidence` binds each supplied completed state to its governed evidence as described below. Default graph execution keeps unknown prerequisites pending; `design_gap` produces not `_activated` for dependent effects. `--dispatch direct` bypasses only that check, and still requires policy, measurement, risk-set, coverage and code evidence. It does not create predecessor evidence or write registered states back to the World. Synthetic tests exercise both paths.

Endpoint vectors use `lo/hi` to preserve unknown registration. A confirmed cumulative event stays one after later disappearance. No complete-case or selected-survivor analysis is implemented. **estimate** is the confirmed-record contrast; **point_bound_*** and **bound_*** target the linear contrast allowing unknown observation. `Bias1/Bias2` widen simultaneous sets by $1/2pp$. None is an unrestricted causal result. Count outputs stay confidential until custodian disclosure review.

The code intentionally blocks unverified service periods and unspecified civil/family semantics. It does not supply a fabricated historical dictionary, referral date, migration date, waiting-list measure, first-birth validation or private-therapy history. These are runtime evidence requirements or scientific limits, not TODO implementations. `test_reference.py` creates synthetic counterexamples in memory. Figure tests separately cover complete, partial and absent plot-ready inputs; their fixtures cannot be selected by production analysis.

`baseline.csv` (`index_year`, `age`, `field`, `category`, `n`) accompanies each executed effect analysis. Parent-formation flags are person counts by index year, age and horizon; absent flags become zero only after a complete successful construction, never on a missing output.

Baseline construction flags in `diagnostics.csv` make parent-link/address/history exclusions and unknown partner recognition/civil status/missing-spouse coverage explicit. Baseline flags occur once per resident/cohort/horizon; subsequent construction flags may count repeated intervals and must not be described as unique persons. Whole follow-up delivery gaps remove only the affected cohort/horizon; component-specific baseline-history/field gaps retain unrelated outcomes. `component_gaps.csv` and fixed effects rows expose each failure.

Additional registered products: `atom-000004` also emits `partner_exposure.csv`, `baseline_dyads.csv`, `pair_composition.csv` and `construction_flags.csv`. Exact keys, allowed strata, denominators and units are registered in `atom-000004`; no new runtime choices. `atom-000001` emits `boundary_week.csv` and `diagnostics.csv` `check=boundary_week_exclusion`. `atom-000002` `diagnostic_coverage.csv` enumerates 18 year/age/component records; `diagnostic_rates.csv` retains pooled age rows

plus `known_n`, `rate_upper`, `unknown`, `baseline_unknown`. Only complete ascertainment permits its sampling intervals. All effect Atoms emit `component_gaps.csv` and disposition endpoint `statuses`. Outputs are aggregate but still subject to custodian disclosure rules.

`validate_policy_design` is called before service construction for atom-000001 and before dependent direct analyses. Its required baseline cells prevent `code_gap` from masking `design_gap`. `ServiceGap` explicitly identifies service failures; exception-message text cannot select a state. A finished `no_result` predecessor gives `not_activated` under graph dispatch via the registered `done` guard; an unfinished predecessor stays pending. Direct dispatch never bypasses this scientific input validation.

Run `PYTHONDONTWRITEBYTECODE=1 python -B -m unittest discover -s docs/execution -p 'test*.py' -v` from the World root, or copy source/tests alongside each other into a writable execution directory. `test_observation_semantics.py` contains semantic counterexamples for unknown recognition/IDs/addresses, missing birthday years and component lookbacks, baseline-union widowhood/remarriage/divorce, recognition after death, access-state precedence, the predecessor truth table, partner exposure and boundary weeks. Fixtures are created in memory. Figure tests render all five registered interfaces with complete, partial, unavailable, zero-denominator and long-reason inputs; only the separate presentation preview layer stamps hypothetical disclosures.

Additional boundary tests in `test_scoped_boundaries.py` check that a later unmapped service code preserves the earlier horizon; wholly unknown family semantics leave partner counts missing while legal outcomes survive; and partially known versus genuinely empty baseline partner populations stay distinct. Optional columns `baseline_unknown/reason` in the descriptive interfaces carry these restrictions to paper tables. The preview generators are never imported by production analysis.

Invocation provenance and caller responsibilities

Each `run_atom` return includes `disposition.json.invocation`, even for pending, `not_activated`, direct dispatch, scoped data boundaries and `no_result`. It records canonical UTF-8 JSON/SHA256 fingerprints of the complete metadata and each relevant metadata component, Python/platform/package versions and table presence, fields, dtypes and aggregate input row counts. It never serializes private input rows. The outer disposition records the actual reference-code SHA256, `implementation_sources` checksums for the shared implementation and numbered entrypoints, and hashes/row counts of every emitted aggregate CSV, plus construction-accounting output references. `dictionary_provenance_gaps` counts entries lacking documentary source/checksum fields, without exposing private data or inventing certification.

The governed caller supplies `input_manifest` (stable delivery/source identifiers and input-file checksums), `delivery_certificates` (inventory/coverage validation identifiers), and `construction_accounting` (adapter population, dropped-identical-row and exclusion accounting references). For SSSY, supply `billing_adapter_evidence` identifying source versions, correction procedure, source-code hash and before/after aggregate counts for the net-final extract, plus `fee_week_source` for the official decoding source. Dictionaries retain `source/source_sha256` and effective dates as

already specified. These metadata objects are hashed; the full manifests remain in governed storage. Credentials and confidential row values must never enter them. An omitted caller-provenance component is explicitly listed in `missing_caller_provenance`; no fingerprint or validation is invented. Existing required dictionary/coverage scientific checks continue to apply.

Optional DODSAASG, including an explicitly empty DataFrame, requires `death_periods=[{start,end,source}, ...]`. Every supplied death date must fall in a certified interval within the documented 2002–2022 event scope. The extract name DODSAASG2022 does not restrict event dates to 2022. A missing certificate or out-of-certificate row is `no_result` until a documented adapter supplies the correct scoped input; absence of the optional table leaves exits unresolved under BEF rules.

`test_provenance_and_pairs.py` independently checks the age26-only bad service, required main-age failure, auxiliary-only failure, baseline widow with another partner, another spouse’s death and later real separation, original-partner death, unknown widowhood timing, standard codes accompanied by supplemental/telephone rows, pre-2022 certified death and metadata-only provenance changes. No new clinical endpoint or experiment is created. `formats.csv` and `boundary_week.csv` preserve unavailable age/horizon rows with known `n` but missing use quantities; their optional reason column carries the scoped failure. Main cell records survive a different cell’s failure, while the unsupported main contrast remains unavailable.

Private event reconstruction and aggregate descriptions

`ComponentOutput.events` retains private `EventTrace` objects solely during construction. Each trace holds adjacent reference dates, known/unknown interval evaluations, the inherited event bounds and a certified first-recognition interval only when earlier eligible intervals exclude the event. `residence`, `partnership` and `parenthood` produce these traces from their original algorithms; `joint_products` constructs original-person intersections directly. No aggregate output from another Atom can reconstruct co-occurrence. Private identifiers and quarter trajectories are never written by `run_atom`.

`residential_products` emits the fixed 48-row grid. Its three measures share the original baseline co-resident denominator; leave–return–leave can satisfy both round-trip and sustained-away. An explicit observed sequence determines the lower indicator, and feasible registered sequence states determine the upper indicator. Known parent-only/joint moves do not create strict events. This description does not change the six residence contrasts, the registered result partition or family20.

`joint_products` emits all 384 pattern rows and 48 bound rows even when required cells are unavailable. The row keys, eight-pattern order and marginal/joint bound definitions are exactly those in Atom6 and `interfaces.md`. A zero known denominator yields `empty_risk_set`, count zero and missing fractions. Unresolved baseline membership with no known members yields `data_gap`, with missing event counts; known excluded people are not reclassified using future observation. `partial` retains a positive known denominator and its unknown baseline/event accounting. Whole required-period gaps produce `data_gap`; incomplete invocation/certification produces terminal `no_result`, with unavailable grid rows. Earlier confirmed cumulative events

survive later death/exit. Parenthood order uses recognition snapshot, including the prescribed confirmation window after H when applicable, never the child's birth date.

Atom6 requires no policy chronology, uptake data or completed Atom3–5 files. Family meanings are required for the recognized-partner risk sets; absent optional legal-only fields do not block the recognized address events. Missing child lookback affects `union_parenthood` only. With fixed module/year/age/horizon populations, the eight pattern counts sum to n and finite shares sum to one. Event-membership uncertainty and confirmed events whose order is unresolved remain separate. These outputs have no new estimator, p-value, confidence interval or policy attribution.

Predecessor provenance adapter

Preserve the established `predecessors.json` states/terminals interface. A completed predecessor used to execute the graph must additionally have a `metadata.json` entry under `predecessor_evidence`:

```
{
  "atom-000001": {
    "source": "governed reviewed disposition locator",
    "disposition_sha256": "64 lowercase hexadecimal characters from that
    ↪ file",
    "local_state": "code_gap",
    "terminal": null
  }
}
```

Provide the corresponding entry for Atom2. The governed caller reads and validates the reviewed disposition, computes its actual checksum and binds its state/terminal; the adapter checks checksum syntax and exact agreement with the supplied predecessor state. It does not claim that a hash proves scientific validity, retrieve external files, invent missing evidence or publish the source contents. Missing or inconsistent provenance on an otherwise active graph route produces operational `no_result`; a pending route stays pending and a closed route stays not_activated. Direct dispatch uses no predecessor result to select scientific inputs, still records supplied states/terminals and their provenance fingerprints, and still performs all native policy/measurement/input checks. This binding adds no scientific threshold or statistical state.

Invocation fingerprints are not certificates of dictionary authenticity. The caller must retain and verify each effective dictionary record's source/source_sha256 and documentary coverage, including explicitly empty extracts, in governed storage. Every absent provenance component is reported; no runtime availability or identifying variation is inferred from a filename, schema or successful synthetic run.

Final scientific interfaces for Transcriber

This editorial handoff reuses the supplied six-Atom implementation, including Atom6 and Atom3 residential paths. No new analysis output is requested. The six-Atom semantic and portable-dispatch tests were executed with synthetic inputs. The revised

figure4 quarterly encoding, display labels and hypothetical previews are implemented; the handoff records actual test and PDF inspection coverage.

Entry-point and source index

Retain the shared callable signature `run_atom(atom, tables, metadata, *, states=None, terminals=None, dispatch='graph', output=None)`. `tables` is a mapping of named authorized tables to certified normalized DataFrames; `output` is an explicit writable directory outside the frozen World. Predecessor evidence is supplied through validated `states/terminals` and its provenance. Return disposition plus aggregate products. Never accept a filename as evidence of coverage or a mere state string as a substitute for certified predecessor provenance.

Number final experiment and visualization sources independently. The names below are determined implementation targets for Transcriber; their functions may call shared code. They do not create new scientific units.

Experiment template group	Atom / common callable	Required outputs and implementation status
01-policy-access-template	atom-000001 / <code>run_atom</code>	Retained effect/cell/baseline/diagnostic/component-gap products; exposure.csv, formats.csv, boundary__week.csv and disposition. Reconcile baseline implementation and dated adapters.
02-recognition-template	atom-000002 / <code>run_atom</code>	Retained diagnostic__rates.csv, coverage/accounting and disposition. Independent TRUE activation.
03-residential-trajectories-template	atom-000003 / <code>run_atom</code>	Retain six main contrasts and full diagnostics; retain implemented residential__paths.csv with 48 exact measure rows. No new main tests.
04-partnership-trajectories-template	atom-000004 / <code>run_atom</code>	Retain ten main contrasts, partner__exposure.csv, baseline__dyads.csv, construction__flags.csv and other registered accounting.

Experiment template group	Atom / common callable	Required outputs and implementation status
05-recorded-parenthood-template	atom-000005 / run_atom	Retain two main contrasts and all newborn/older/late/death/history flags.
06-joint-transitions-template	atom-000006 / run_atom	Retain implemented shared-event reconstruction under independent activation;384 joint_patterns.csv rows,48 joint_bounds.csv rows, component_gaps.csv and disposition. No SSSY dependency and no output-file dependency on Atoms3–5.

Visualization template group	Stable ID / manuscript number	Scientific inputs
01-access-opportunity-template	figure1 / Figure1	Atom1 exposure/effects; retained figure1.py as starting source.
02-recognition-template	figure2 / FigureS1	Atom2 diagnostic_rates and coverage; retained figure2.py.
03-relationship-contrasts-template	figure3 / Figure2	Atoms3–5 effects; retained figure3.py.
04-counterfactual-template	figure4 / Figure3	Atoms1,3–5 diagnostics; retained figure4.py.
05-joint-patterns-template	figure5 / Figure4	Atom6 joint_patterns; retain the implemented fixed2021/h24 six-row, three-module heatmap.

Table renderer templates use a separate numbered visualization group or the corresponding display group with explicit table ID; they may share formatting utilities. `../paper/tables.yaml` owns exact row selectors for new tables and `results-map.md` retains prior scientific bindings. No renderer computes a new scientific contrast, fits a regression or makes an outcome-dependent row selection.

Shared adapters and existing outputs

The retained `README.md` documents the baseline adapter's required metadata: delivered BEF dates; historical family/civil dictionaries; specialty and dated service crosswalk; certified billing periods and fee-week map; net-final correction evidence; policy/announcement sources; optional mortality periods; and input/construction manifests. Apply each requirement only to the module that needs it. Atom6 requires the BEF/dictionary/optional-death subset relevant to its three modules, not therapy-use data or a certified clinical first stage. No person-row data may leave the authorized environment.

Retain every existing effect, diagnostic and accounting output, including endpoint-specific missing rows, family20 membership, ordinary and simultaneous intervals, fixed B scenarios, precision restrictions and baseline membership gaps. The native protocol's exact field lists govern. Added descriptions must reuse the event logic; do not join aggregate `cells.csv` outputs to infer person-level co-occurrence. Shared constructors may return private internal person-quarter state objects, but only aggregate scientific products and nonprivate provenance are exported.

Residential paths

`residential_paths.csv` has 48 rows: `index_year` ∈ {2017,2018,2019,2021}, `age` ∈ {24,25}, `horizon` ∈ {12,24}, `measure` ∈ {leave,sustained_away,leave_then_return}. Required columns are `n`, `count_lower`, `count_upper`, `p_lower`, `p_upper`, `unknown`, `baseline_candidates`, `baseline_unknown`, `status`, `reason`. Each cell uses original baseline co-residents, including no-event people. `p` bounds divide counts by `n`; `unknown` = `count_upper` - `count_lower`. There is no confidence interval, `p`-value or new policy contrast. The existing residence main-state partition is unchanged. Scientific absence of a required period, empty denominator and operational failure remain distinct.

Preserve the event history needed to distinguish a new strict return after confirmed leave from the original baseline-away return endpoint. Known parent-only/joint moves cannot create this strict sequence. Test `leave` → `return` → `leave` explicitly: both round-trip and sustained-away may be one. Do not force three measures to partition the cohort. TableS9 has 16 rows and three paired-bound columns, representing all 48 source rows without repeating the population three times.

Joint transitions

`joint_patterns.csv` has 384 rows with keys `module`, `index_year`, `age`, `horizon`, `pattern`. Modules and A/B definitions are native: `home_union(leave,union_entry)`, `return_separation(return,separation of original pair)`, `union_parenthood(union_entry,parenthood)`. The eight pattern names/order, required columns and classification algorithm are fixed in Atom6. `joint_bounds.csv` has 48 rows keyed `module`, `index_year`, `age`, `horizon` with `n`, `a_lower`, `a_upper`, `b_lower`, `b_upper`, `both_lower`, `both_upper`, `unknown`, `baseline_candidates`, `baseline_unknown`, `status`, `reason`.

For an available `n > 0` cell, all eight counts are nonnegative integers summing to `n`; shares sum to 1 before rounding. A and B marginal bounds lie in $[0,1]$; `lower` ≤ `upper`;

joint lower $\leq$ both marginal lowers; joint upper $\leq$ both marginal uppers. **unknown** in joint_bounds counts event-membership uncertainty, not people whose events are confirmed but order is unresolved. **both_order_unresolved** remains its own pattern. Numeric zero requires completed construction; missing keys or ambiguous duplicates are errors, never zeros or values to average. Baseline_unknown is not included in the within-n bounds.

The joint display uses 2021/h24 only by fixed design, not selection after results. Tables S10 and S11 retain all 48 cells. Table S10 has eight share columns so all 384 pattern values appear without 384 repetitive row headings. Table S11 contains all marginal/joint bounds and status. Table 3 in main text is the six-cell 2021/h24 extract of these bounds and denominators, complementing rather than repeating the pattern figure. No new equality tests, family adjustment, causal bias intervals or significance stars are computed.

Synthetic checks and dispatch

Use temporary directories outside the World and in-memory synthetic records; do not ship raw fixtures. Retain useful baseline tests and add meaningful counterexamples for the changes. Required Atom6 cases: neither; each single event; both strict orders; same observed quarter; overlapping brackets; prior unknown then confirmed events; delayed newborn recognition despite an earlier birth; missing baseline membership; missing child history with residence/partnership modules still supported; empty risk set; unknown original-pair identity; matched widowhood; parent-only move; confirmed event then death/exit; uncertified mortality dates. Check exact output grids, partition identities and interval monotonicity.

Required Atom3 cases: observed leave then strict later return; leave followed only by parent relocation; unresolved gap before return; no detected round trip under fully observed quarters; leave $\rightarrow$ return $\rightarrow$ leave; death before a possible later sequence; unchanged baseline denominator. Ensure adding descriptions changes neither main effects nor family20/registered outcome-state logic.

Graph tests must establish that 1,2,6 are independent; pending predecessors keep 3–5 pending; completed no_result closes required routes; code_gap permits 3–5 only when the native remaining conditions hold. Atom6 must run its own BEF validation without requiring completed outputs from 3–5. Direct dispatch changes only activation handling and is logged; scientific inputs remain mandatory. Test no confidential IDs in aggregate exports and all required input/metadata/code/software/output hashes.

Render complete, partial, zero-denominator and unavailable aggregate interfaces for every figure/table. Missing must be visually different from zero; observation bounds must be visually different from sampling intervals; percent conversions occur once. A separate preview layer creates hypothetical summaries only when explicitly asked, labels every exhibit and never enters production dispatch. Compile both main+SI and readable protocol+canonical appendix, inspect actual rendered pages and record coverage in `./paper/paper-handoff.md`. Current execution and rendered-inspection coverage are recorded there; synthetic tests do not establish delivered-data availability or identification.

Current quarterly-path display interface

Editorial timing specification, 9 September 2026 UTC / 8 September 2026 America/Chicago: the quarterly comparisons already incorporated from docs/protocol/identification.md are displayed over their registered clock. Figure4 (reader Figure3) binds diagnostics.csv, check=trajectory_lead for horizon in {-9,-6,-3,0} and check=trajectory_curve for horizon in {3,6,9,12,15,18,21,24}, separately for every outcome of this Atom. Fields value,lower,upper,status,reason retain their existing meanings: confirmed-record age-by-era contrasts and ordinary pointwise conditional 95% intervals. These are descriptive timing diagnostics, not additional confirmatory tests, simultaneous path bands, observation-bound intervals, or bias-widened causal trajectories. Reuse the same baseline risk sets, event constructors, era weights and uncertainty rules; do not recenter at rollout, fit a new event-study regression, smooth, interpolate missing quarters, or infer a hazard. The sustained_away and same_partner outcomes describe horizon-specific states and need not be monotone; the other registered cumulative-event probabilities do not make their age-by-era differences monotone. Persistence rules and recognition windows themselves affect visible timing. No difference between time points or domains is tested here, and a pointwise interval first excluding zero does not establish causal onset. Directional main claims still use the registered 20-comparison family at h12/h24 and its observation/bias sets. Retain every quarterly position, displaying missing positions with their scoped reason; a renderer may show an absent row as unavailable but must not invent its scientific disposition. Existing age25_26_placebo, reference-year and leave-one-year diagnostics remain fully reportable in Tables S3a/S3b and the bound aggregate outputs. No activation, local result region, hypothesis, population or output column is changed by this display binding.

The 04-counterfactual-template.py renderer and its figure4.py wrapper implement this quarterly display against figures.yaml without changing reference.py science. Current groupby output can lack a row when every source cell is unavailable. Explicitly reindex the registered 10×12 display positions, mark absent inputs unavailable, and use component_gaps/disposition provenance where supplied; do not synthesize a data_gap verdict from absence alone. The renderer performs selection and a once-only $\times 100$ scale conversion, no estimation. Test complete, point-only, missing-quarter, wholly unavailable and long-label inputs; missing quarters must not be bridged. No new p-value or contrast between quarters is permitted.

Execution reporting and provenance

The scientific schedule is fixed in Atom registrations and protocol/SAP §13. Commands and adapters are indexed in README.md. The following supplied details are retained as execution guidance rather than paper SI.

S6 Evidence states, reproducibility and scope

All six scientific units belong to the Molecule from birth. The policy/access unit, historical-recognition diagnostic and joint-transition description are initially active. The joint-transition unit validates its own BEF measurement prerequisites and does

not require policy-effect result files. The residential, partnership and parenthood units require a usable policy definition with one of the registered uptake dispositions and a resolved local state for the recognition diagnostic. A finished operational no-result from either mandatory predecessor closes the dependent route as not activated. A predecessor still being evaluated leaves that route pending. The explicit completion guard distinguishes those cases without creating a statistical result. Direct execution for a named unit can bypass graph scheduling only; it still requires the same exposure, coding, observation and risk-set evidence, and its provenance records the dispatch mode.

Within an activated trajectory unit, the first matching result region applies: no constructable endpoint yields a data boundary; positive and negative directions surviving the 2-point allowance yield mixed directions; one or more surviving directions without that mixture yield a bounded shift; directions surviving only zero additional bias yield a sensitive shift; available point evidence without resolved direction yields inconclusive. Unexpected scientific conflicts remain in the registered residual state. Partial measurement is reported alongside every retained result. These regions are numerical/reporting distinctions and never certify the bias allowance, the inference approximation or the therapeutic mechanism.

The supplied unexecuted design was refined before data in the authorized Blueprint stage. All empirical results remain pending. The scientific amendment records the new joint-transition and residential-path descriptions and distinguishes them from the prior baseline. Invocation records must identify actual metadata and dictionary fingerprints, delivery/adaptor evidence, code/software versions and aggregate construction accounting. The execution index identifies the per-Atom reference implementations, shared event constructors and reusable synthetic cases for the final scientific design. Production figure functions consume registered aggregate outputs and cannot estimate new effects. Separate hypothetical preview sources provide the labeled displays while real result slots remain pending. The editable table layer retains every original row and empirical binding; its numerical examples are generated separately and never read by analysis code. Runtime evidence, rather than synthetic tests, determines whether delivered histories and identifying assumptions support the study.

S7 Interpretation of ascertainment and dependence

The full accounting tables are placed in SI because their purpose is to audit the scope of the main transition comparisons. Table S1 distinguishes baseline populations from endpoint observation; Table S4 separates confirmed events, unresolved records and competing events. An unresolved address is not an emigration date. If documented death precedes a still-unrealized event, the individual remains in the baseline denominator and death is a competing event; a confirmed earlier event remains confirmed. For sustained residence apart and endpoint partner continuity, the full endpoint definition also needs to be met. DODSAASG2022 is an extract vintage for a catalogue event scope of 2002–2022, not a restriction to deaths occurring in 2022. Neither the vintage nor that documented span certifies delivered death histories: optional dated evidence can resolve a particular record only within its documented delivery.

A recognized partner need not be the legal spouse. For a baseline recognized pair, a civil widowhood transition closes the pair only when the preceding legal spouse identity is that original partner and the effective widowhood date lies in the observed interval; certified death of either original member also closes it. Pre-existing widowhood or another spouse’s death does not terminate observed co-residence or erase later separation. Unmatched identity/timing remains an ascertainment flag, with unknown addresses bounded rather than assigned a death. Later observation follows the original partner identity even when the family algorithm changes its label. A known address split may therefore qualify as separation without a change in legal status. Return to co-residence with the same original person makes endpoint continuity compatible with an earlier separation. New recognition of a different person is described separately and cannot erase the history of the original union. Legal dissolution instead follows the original legal union using civil-status history and effective dates; widowhood closes that union as a competing event. A later divorce from a new spouse cannot be counted as dissolution of the original union.

Unknown semantics affect descriptive ledgers as well as effect estimation. For partner exposures and construction flags, the known subset has its own denominator and an explicit count of unresolved baseline memberships. A displayed zero is allowed only for a known empty cell in a certified construction. If everyone’s baseline recognition is unresolved, counts and denominators are unavailable. This distinction matters because an apparently empty partner population might otherwise be read as proof that partner exposure or reclassification cannot matter. Table S6 reports person counts and unique dyads separately; the unit of the effect remains the baseline person.

The two clustering dimensions address specific observed dependencies. Family components join all baseline kin, recognized partners and co-residents across the included cohorts, so repeated index observations and both observed members of a pair are not treated as independent. Calendar birth-month clusters allow a second shared component of variation. They do not reproduce the distribution of repeated national policy reforms: only one 2021 rollout is studied. Newly formed cross-component partnerships, geographically shared housing shocks or other dependencies may remain. The conditional confidence calculation and the fixed bias allowances answer different questions; widening for bias does not validate a misspecified variance model.

S8 Source and measurement decisions that bound the claim

The reform is an offer within a clinically restricted referral scheme. BEF age eligibility is not a diagnosis, and SSSY fee weeks are not referral dates. Restricting to people who later claim care would select on a response to access. The population comparison instead retains all baseline residents in the registered ages. The descriptive format ledger distinguishes standard individual first/follow-up codes from independently coded double, video/advice, two-person and group billing. It cannot identify all privately paid treatment or certify that every standard individual consultation delivered a particular psychotherapy modality. A transfer of existing privately paid care into public billing remains compatible with increased public use; an encounter’s physical location is not established.

Historical code versions are therefore part of the measurement argument. The January 2022 agreement removes the 02XX series for ordinary subsidized care while preserving free-care consultation categories. The implementation requires a dated dictionary and certified billing periods, and validates actual rows separately within each age band and necessary window. A code failure confined to diagnostic age 26 leaves supported age-24/25 comparisons intact; a failure confined to an auxiliary quarter cannot classify both main horizons as a service-code boundary. Unsupported diagnostic rows retain their reasons. If a later unsupported code prevents the 24-month calculation, a fully supported 12-month calculation remains visible. This is partial evidence with an explicit boundary, not a revised follow-up choice. When no horizon is supported, the code boundary leaves legally documented access separate from unmeasured uptake.

The parenthood result uses a finite observed-history population. Five preceding December snapshots and four preceding quarters reduce ambiguity about existing resident-child links, but cannot reveal every prior child outside that history or abroad. Inverting links on all supplied child records includes children living elsewhere; it does not create a biological relationship not recorded by the register. Recognition of an older child, late linkage of a newborn, and a first observed link after the parent's documented death have separate ascertainment categories. Neither their absence nor a weak estimated contrast establishes no pregnancy or no change in intentions.

The theory consequently supports more than one empirical configuration. Improved interpersonal capacity could coexist with departure, continued support from parents, union stability or separation. Direct copayment relief could also affect housing or family timing without increased billed use. Provider responses could alter access for both age groups. The data can distinguish recorded transitions, formats and some recognition artefacts; they cannot adjudicate all these pathways. The main Discussion retains these rivals under each registered result state instead of selecting a clinical story from the signs of the estimates.

Complete registered Molecule

```
id: molecule-000001
molecule_mode: prereg
molecule_shape: convergent
topic: Psychotherapy and relationships
rating: B
draft: false
membership:
- atom: atom-000001
  role: primary
  description: Does the 2021 waiver create a documented exposure contrast
    and increased use recorded under standard individual first/follow-up
    ↪ consultation
    codes?
- atom: atom-000002
  role: supplementary
  description: Do administrative family and partner changes occur without
    changes in people or shared addresses?
- atom: atom-000003
  role: primary
```

description: Does the age-targeted access regime change departure, sustained residence apart and return to parents?

- atom: atom-000004
 - role: primary
 - description: Does the age-targeted access regime change observable union entry and continuity of baseline partnerships?
- atom: atom-000005
 - role: primary
 - description: Does the age-targeted access regime change newborn-linked
 - ↪ recorded parenthood?
- atom: atom-000006
 - role: secondary
 - description: Which residential, partnership and recorded-parenthood
 - ↪ transitions concern the same baseline people, and which observed sequences can
 - ↪ quarterly records distinguish?

literature: []

frontier:

- rule: Does the July2021 psychotherapy access regime change young adults' registered relationship trajectories?
- avoid: Treatment-received, subjective recovery, welfare rankings, unbounded causal attribution and unused design history.
- directions: []

preregistration:

- version: 1
- mode: adaptive
- question: Does the July 2021 age-targeted psychotherapy copayment waiver change young adults' registered residential, partnership and parental trajectories?
- scope: Baseline residents aged24 versus25 at July2021 and fixed
 - ↪ historical2017-2019
 - comparators; h12/h24, fixed pre-exposure risk sets; BEF/SSSY with optional dated DODSAASG; conditional policy-regime contrasts. A separately
 - ↪ registered
 - descriptive comparison uses three known pre-exposure intersection
 - ↪ populations
 - to characterize joint event recognition; it requires no policy first
 - ↪ stage.
- storyline: 'Begin with young adults'' decisions about parental residence, shared households and parenthood, without assigning a welfare sign.
 - ↪ Explain the policy's new-referral opportunity and its financial and supply channels;
 - verify billed standard consultation use instead of equating entitlement with treatment. Establish why person/address histories, original partner identities and timely newborn links are the relevant observable objects. Compare all nine relationship endpoints at the two registered horizons, in separate fixed baseline populations, then use the already registered quarterly contrasts to reveal the timing hidden by those endpoints. The time paths are descriptive diagnostics: they do not replace simultaneous observation/bias sets or identify clinical onset. Historical, lead and adjacent-age contradictions constrain the main interpretation regardless of favorable endpoint evidence. Finally describe which registered events coexist and can be ordered among the three original intersection
 - ↪ populations,
 - retaining neither-event and uncertain observation. Residential round trips remain a complementary description among original co-residents. Main text

carries these questions, indispensable methods and consequential
↳ limitations;
scientific SI explains construction, inference and complete detailed
↳ evidence;
protocol/result maps retain all decision and interpretation branches;
engineering documentation owns commands and adapters. Narrative sequence
does not determine activation. Observed co-occurrence does not identify
joint individual treatment effects or mediation.'

interpretation:

- kind: restriction
condition: 'TRUE'
says: Every direction is conditional on the registered counterfactual
and stated bias allowance. No unrestricted causal effect,
↳ therapy-received
LATE, mediation, universal welfare sign, comprehensive romance or true
first biological parenthood is identified. Restrictions dominate all
compatible claims. Observed joint events do not identify whose
↳ individual
treatment effects are jointly nonzero.
- kind: restriction
condition: state(atom-000001) == "design_gap" OR terminal(atom-000001)
== "no_result" OR state(atom-000001) == "otherwise"
says: The policy exposure assessment is unresolved; downstream Atoms are
not activated under the closed graph. Independent measurement and
↳ joint-pattern
Atoms retain their own activation and scientific prerequisites; report
any supported descriptions separately without causal attribution.
- kind: restriction
condition: terminal(atom-000002) == "no_result"
says: The shared measurement assessment finished without a scientific
state; dependent relationship Atoms are not_activated. Unfinished
↳ predecessors
remain pending. No operational status is a statistical result. Atom6
has independent activation and must validate its own inherited
↳ measurement
prerequisites; descriptive success does not reopen the closed policy
route.
- kind: restriction
condition: state(atom-000001) == "code_gap" OR state(atom-000001) ==
↳ "uptake_uncertain"
OR state(atom-000001) == "uptake_decrease"
says: An increased standard individual-therapy margin is not established.
Relationship contrasts cannot be called effects of receiving more
↳ individual
therapy; no therapeutic null follows.
- kind: supplementary
condition: state(atom-000002) == "artefact_present"
says: Confirmed reclassification demonstrates why person/address outcomes
are needed. It does not itself establish the reform effect or invalidate
properly observed identity trajectories.
- kind: supplementary
condition: state(atom-000001) == "uptake_increase"
says: Report increased billed standard consultation use at the specific
supported horizon and any discordant horizon; public substitution and
financial/supply channels remain. This is use under standard individual
first/follow-up consultation codes; office setting, encounter duration
and modality are not established. Age26-only or auxiliary-quarter
↳ service
gaps do not erase supported main uptake horizons.
- kind: restriction

```

condition: state(atom-000003) == "data_gap" OR terminal(atom-000003) ==
    "no_result"
says: Residential trajectories remain unresolved; report exact missing
    endpoints and keep them in family20.
- kind: primary
condition: state(atom-000003) == "bounded_shift" OR state(atom-000003)
    == "mixed_directions"
says: Report the supported residential trajectories directions with
    ↪ simultaneous
    observation bounds and explicit 2pp bias assumption. Mixed signs remain
    disaggregated; missing margins and conclusion-changing diagnostics stay
    in the main narrative.
- kind: primary
condition: state(atom-000003) == "sensitive_shift"
says: Residential trajectories have directional contrasts only under the
    stronger B=0 assumption; do not call them robust policy effects.
- kind: primary
condition: state(atom-000003) == "inconclusive"
says: Residential trajectories do not resolve a direction at the
    ↪ registered
    uncertainty level. Report intervals and precision/coverage limits, not
    no effect.
- kind: restriction
condition: state(atom-000004) == "data_gap" OR terminal(atom-000004) ==
    "no_result"
says: Partnership trajectories remain unresolved; report exact missing
    endpoints and keep them in family20.
- kind: primary
condition: state(atom-000004) == "bounded_shift" OR state(atom-000004)
    == "mixed_directions"
says: Report the supported partnership trajectories directions with
    ↪ simultaneous
    observation bounds and explicit 2pp bias assumption. Mixed signs remain
    disaggregated; missing margins and conclusion-changing diagnostics stay
    in the main narrative.
- kind: primary
condition: state(atom-000004) == "sensitive_shift"
says: Partnership trajectories have directional contrasts only under the
    stronger B=0 assumption; do not call them robust policy effects.
- kind: primary
condition: state(atom-000004) == "inconclusive"
says: Partnership trajectories do not resolve a direction at the
    ↪ registered
    uncertainty level. Report intervals and precision/coverage limits, not
    no effect.
- kind: restriction
condition: state(atom-000005) == "data_gap" OR terminal(atom-000005) ==
    "no_result"
says: Recorded parenthood remain unresolved; report exact missing
    ↪ endpoints
    and keep them in family20.
- kind: primary
condition: state(atom-000005) == "bounded_shift" OR state(atom-000005)
    == "mixed_directions"
says: Report the supported recorded parenthood directions with
    ↪ simultaneous
    observation bounds and explicit 2pp bias assumption. Mixed signs remain
    disaggregated; missing margins and conclusion-changing diagnostics stay
    in the main narrative.
- kind: primary

```

```

condition: state(atom-000005) == "sensitive_shift"
says: Recorded parenthood have directional contrasts only under the
↳ stronger
    B=0 assumption; do not call them robust policy effects.
- kind: primary
condition: state(atom-000005) == "inconclusive"
says: Recorded parenthood do not resolve a direction at the registered
    uncertainty level. Report intervals and precision/coverage limits, not
    no effect.
- kind: restriction
condition: 'TRUE'
says: Joint-pattern fractions and residential round trips describe fixed
    baseline populations; they do not identify therapy mechanisms, causal
    event order or population flows across unlike risk sets. A
    ↳ within-quarter
        tie means shared observation interval only. Unknown baseline membership
        is outside observation bounds and limits generalization. No new main
        hypothesis family is introduced.
- kind: supplementary
condition: state(atom-000006) == "cooccurrence_observed"
says: Describe the exact supported joint transitions, denominator and
    observed timing, including unresolved order and people with neither
    event. Co-occurrence is descriptive regardless of uptake or
    ↳ marginal-effect
        states; it cannot explain how much of a policy contrast is mediated.
- kind: supplementary
condition: state(atom-000006) == "no_cooccurrence_observed"
says: Report no observed registered co-occurrence in the complete fixed
    windows. Do not infer absence of a mechanism, within-quarter transitions
    or longer-run family changes.
- kind: restriction
condition: state(atom-000006) == "data_gap" OR state(atom-000006) ==
    ↳ "unresolved_overlap"
        OR terminal(atom-000006) == "no_result"
says: Retain supported cells and list missing intersection histories or
    unresolved membership/order. Failure to establish co-occurrence does
    not establish distinct people or a causal null, and does not erase
    ↳ independent
        marginal endpoints.
- kind: residual
condition: 'TRUE'
says: Report every remaining pending, otherwise, partially available,
    not_activated or no_result member and endpoint. This does not override
    restrictions or convert absence into evidence. Joint changes across
    domains do not establish an ordered causal chain. Mandatory descriptive
    outputs and their gaps remain reportable even when they do not change
    a main Atom state.

```

The native payload and member Atom registrations own the scientific design.

Current interpretation

All six Atoms are registered and pending. No experimental findings exist.

atom-000001: Policy access

Optional DODSAASG PNR/D_DODSDATO supplies documented death evidence only within its certified event period within the documented 2002–2022 scope; absence outside that period never establishes survival.

Question and role: Does the July 2021 regime generate the intended age-specific entitlement and a measurable change in use recorded under standard individual first/follow-up consultation codes? This consequential access judgment supplies the common interpretation of all relationship experiments. It is not another health-outcome study or an IV first-stage certificate.

Use BEF age bands and baseline cohorts defined in the data contract, regardless of therapy history. SSSY joins many billed services to one person/cohort; do not join raw records directly to all child/parent rows. Validate full calendar-year/week mapping, transaction corrections, semantic service crosswalk and complete periods before treating no record as no public use. HONUKE defines the billing clock. Each service week is assigned by its Monday; repeat descriptively excluding weeks intersecting baseline, rollout or horizon boundaries, with no new estimate chosen. Prefix agreement between SPEC2 and zero-padded six-digit SPECIALE is mandatory. Negative/ambiguous cancellation totals block the affected billing period.

Pseudocode: 1. Load baseline residents at B_c, validate ages at R_c and invariant birthdates; retain age26 for diagnostics. Assert no individual index-person entitlement before July2021 in the main age24/25 2021 bands by daily eligibility function: age18–20 from July2018; age18–21 from October2019; age18–24 from July2021. Produce exposure.csv rows index_year, age, birth_month, prior_eligible_days, new_eligible_days_min, new_eligible_days_max, n (suppress as required). Distinguish possible new-referral days from continued-course care; never end observed use at birthday25. Public dated evidence that relevant anticipation predates B_2021 or contradicts eligibility makes design_gap. 2. Validate dictionaries effective for each required billing period. Only after ALL four baseline censuses contain ages24 AND25 and daily entitlement checks pass, if policy/census support is established but standard individual coding or SSSY delivery is evidenced unavailable, emit code_gap and NA uptake rows; retain exposure outputs. A transient failed query is no_result, not code_gap. 3. Mark primary standard consultation use when verified specialty63 service is an standard individual first/follow-up consultation with net positive YDLANT. ANY at B_c < fee_Monday ≤ H_c, h gives binary uptake. Do not condition on starting a new course; existing users remain. Aggregate descriptive any-standard-individual, double, remote/advice, two-person, group and unclassified billed-format shares by age/era/horizon, each over the baseline population. These categories can overlap across a person's courses; do not sum their probabilities as a distribution. Codes are author-specified semantic inclusion, actual vintages are runtime validation. 4. Estimate uptake12 and uptake24 using the shared fixed contrast; provide cell counts, pre-rollout and comparator-age diagnostics. Apply shared simultaneous uncertainty and B sensitivity. Neither expected signs nor earlier published first stages are an input. 5. Adjudicate in order: design_gap; code_gap; uptake_increase if B=0 simultaneous lower bound >0 at either registered horizon; uptake_decrease if no such increase and B=0 upper<0 at either horizon; uptake_uncertain otherwise when at least one uptake

estimate is defined. If both signs occur, the first matching state is uptake_increase but disposition marks discordant_horizons and the Molecule requires both signs to be reported. Missing precision is uptake_uncertain, not no-effect.

Output: standard effects/cells/diagnostics/disposition plus exposure.csv and formats.csv (index_year, age, horizon, format, n, users, share, status). Figure1 consumes exposure/uptake at a stated horizon; all uptake tests remain in the 20-comparison family. Population access may change without greater observed standard consultation use because of substitution, video, capacity or existing-user savings. An increase establishes a billed public standard consultation-use margin under the contrast assumptions, not more total therapy or clinical improvement. No uptake region licenses a therapy-received LATE. Code docs/execution/reference.py: run_atom('atom-000001', ...).

Shared binding definitions: docs/protocol/data-contract.md (fields, effective coding, population clocks, missingness and risk sets), docs/protocol/identification.md (exact cell contrast, inference, 20-comparison family and fixed bias scenarios), and docs/protocol/governance.md. These documents are incorporated in this protocol; implementation cannot choose alternative definitions. All fields come from the named allowed tables. No observed result exists.

Runtime inputs: certified normalized table DataFrames retaining original field names; metadata with source/period/dictionary provenance; read-only predecessor evidence; explicit writable output directory. Never assume supplied rows, cell counts or dictionary validity from a file name. Construction unit is a baseline person-by-index-year, then quarter history; outputs aggregate only. Resolve duplicates and assert cardinalities before any join. No post-exposure exclusions. Individual missing intervals remain unknown bounds; entire missing required periods are evidenced data_gap. Inaccessible or uncompleted operations give terminal no_result and NO registered_state. The entry point logs graph or direct dispatch, but direct cannot bypass these requirements.

All effect products also include baseline.csv (index_year, age, field, category, n), with total cohort and sex, municipality, citizenship and recorded-immigration categories; unavailable context remains labeled. All effect products: effects.csv rows keyed by outcome, horizon with estimate, lower, upper (confirmed contrast and ordinary 95% interval), bound_lower, bound_upper (simultaneous missingness interval at B=0), bias1_lower, bias1_upper, bias2_lower, bias2_upper, raw_p, p_bonf, se, n, clusters_family, clusters_birthmonth, largest_cluster_share, status, reason, breakdown_bias, detectable_contrast. Estimates and limits are probability differences; plotting converts once to percentage points. Cells.csv keys index_year, age, outcome, horizon carry n, events, unknown, competing, p_lower, p_upper; no private IDs. diagnostics.csv keys outcome, horizon, check, value, lower, upper, status, reason contains historical age gaps, lead comparisons, age25-versus26 placebo, three leave-one-year contrasts, missing/competing totals and precision restrictions. Optional row-level trajectories and cluster assignments stay in governed intermediates, never export. disposition.json records local_state or terminal, scoped endpoint failures, upstream states, dispatch mode, dictionaries, code/software hashes and population/exclusion

counts. A missing endpoint keeps its row with status and NaN numerical fields; never drops from family 20.

Synthetic verification: docs/execution/test_reference.py checks fixed clocks, exact birthdays/leap birthdays, duplicate joins, parent-versus-child moves, recognition losses without separation, loss/death/unknown distinctions, newborn versus older-child recognition, empty cohorts, hand-computable contrasts and bound endpoints, family dependence, missing predecessors, default nonactivation and direct dispatch. Code is a reference implementation under the protocol, not authority to repair scientific ambiguity. Figure renderers receive only these registered plot-ready summaries. No result CSV is shipped with this pre-data registration.

Scoped execution and reporting: Component prerequisites are evaluated separately. component_gaps.csv keys index_year, age, horizon, outcome, status, reason retain each established missing requirement; no affected endpoint row is dropped from effects.csv or the fixed family20. A missing return-history quarter does not block leave/sustained_away; a missing inferred-pair field/prior quarter does not block legal endpoints. Whole follow-up gaps still block every endpoint requiring that particular period. Individual unknown risk-set membership is separately tabulated, never selected using later outcomes. disposition.json records endpoint_statuses and predecessor states/terminals. A predecessor that has finished no_result closes its mandatory dependent route as not_activated; an unfinished predecessor stays pending. Direct dispatch bypasses only activation and must still establish the fixed policy, all primary baseline age cells and each endpoint's scientific inputs. Test definitions are in test_reference.py and test_observation_semantics.py. No synthetic data are shipped.

Access precedence is structured, not based on exception text: validate_policy__design checks source chronology/anticipation, dates B2017/B2018/B2019/B2021 and nonempty age24/25 cells, invariant birthdates and actual person-level entitlement histories before uptake_records is called. Age26 absence affects its diagnostic only. Primary prior entitlement must be zero for all eras; new days through h12 must be positive for 2021 age24 and zero for all other main index groups. ServiceGap is allowed to become code_gap only after those checks; missing/uncompleted invocation evidence remains no_result. If at least one uptake estimate is supported, preserve it and classify its directional/inconclusive state, listing other missing horizons. Report discordant_horizons when both directional limits occur.

Boundary-week sensitivity: starting from the primary B<fee_Monday<=H records, exclude every closed Monday-through-Sunday week containing B, R or H (Monday<=boundary<=Monday+6 days). Apply the same rules separately at h12/h24; do not replace primary values or affect activation/verdicts. boundary_week.csv keys index_year, age, horizon contain n baseline persons, primary_users, retained_users, excluded_service_rows (positive net-final specialty63 billing rows, all registered formats), status. diagnostics.csv check=boundary_week_exclusion, outcome=uptake, horizon=12/24 contains the same fixed era contrast after exclusion, value and ordinary conditional lower/upper intervals, status/reason. No new p-value or confirmatory test. Missing service/period input leaves the corresponding rows unavailable. Table S7 and its cells bind these outputs. Service validation is scoped separately to each index year, age band and required horizon after mapping fee weeks. For a relevant person, an

unmapped week cannot be assumed outside the window. An unsupported later service code does not suppress an earlier fully covered horizon; `endpoint_statuses` retain the incomplete uptake scope, while the local state adjudicates available horizons; `code_gap` applies only when neither horizon is constructable because of service evidence. Dictionary-period certification and actual row semantics must both pass within each window. No known code-free period licenses zero use without certified billing coverage. `test_scoped_boundaries.py` contains the later-code counterexample.

Invocation provenance: `run_atom` records a canonical SHA256 of supplied metadata plus separate hashes/presence for the input manifest, delivery certificates, historical family/civil/service dictionaries, certified dictionary periods, fee-week map and its source, billing periods, net-final adapter evidence, death periods, policy chronology and caller construction-accounting manifest. It records Python/package versions, source-code SHA256, input table field/dtype inventories and aggregate row counts, then hashes every emitted aggregate product and indexes construction-accounting outputs. This applies to graph/direct dispatch, scoped boundaries, pending/nonactivated routes and `no_result`. The caller retains source manifests and input-file checksums in governed storage; missing caller provenance is explicitly listed, never invented. No private row or credential is exported. `docs/execution/README.md` specifies the caller interface and `test_provenance_and_pairs.py` verifies metadata-only changes.

Optional death evidence: DODSAASG2022 is an extract vintage for the documented 2002–2022 event register. A supplied DODSAASG DataFrame, including a certified empty extract, requires `death_periods` entries `start/end/source`. Validate every actual PNR/D_DODSDATO against the certified event periods within 2002–2022, with unique consistent dates. Uncompleted certification or out-of-certificate rows require `no_result` and a governed adapter; do not infer survival from absent optional evidence, extrapolate beyond the certified periods or add another register. Absence of DODSAASG leaves BEF observation rules unchanged and exits unresolved.

Primary-versus-diagnostic scope: construct service records separately for ages24, 25,26 inside each year/horizon. A service error for age26 invalidates only its descriptive cells and comparisons requiring26; it cannot remove age24/25 people or change their fixed denominators. Auxiliary-quarter service gaps cannot select `code_gap`. If no main estimate exists, select `code_gap` only when both `h12` and `h24` fail through required age24/25 service evidence and there is no main-age nonservice delivery gap; otherwise `design_gap`. Main comparisons are never inferred from the existence of any service error in the ledger. Retain all `formats.csv` and `boundary_week.csv` rows, with known baseline `n` and NaN users/share when unsupported, status and reason. Retain independently supported main cell probabilities when another required cell fails, but the unavailable contrast stays NaN. Emit unavailable auxiliary diagnostics with their exact service reason.

Primary service construct: standard individual first/follow-up consultation codes 0110/0111,0210/0211,0410/0411, with semantic key `standard_individual`. This describes billed code use, not office setting, encounter duration or a specific psychotherapeutic modality. Home supplements may accompany these codes; the October2021 schedule also has telephone marker1011. Do not match encounters from

fee-week coincidence or infer that a marker certifies modality of another row. Independently coded double, video/advice, two-person and group services retain their separate descriptive categories; unclassified includes historically documented supplemental/administrative codes outside those categories. The earlier agreement also allowed consecutive individual-code billing for doubled sessions, so the six-code measure cannot universally exclude longer encounters. No code list is back-cast without a dated dictionary. Keeping the six-code comparison does not broaden it to all therapy.

Editorial timing specification, 9 September 2026 UTC / 8 September 2026 America/Chicago: the quarterly comparisons already incorporated from docs/protocol/identification.md are displayed over their registered clock. Figure4 (reader Figure3) binds diagnostics.csv, check=trajectory_lead for horizon in {-9,-6,-3,0} and check=trajectory_curve for horizon in {3,6,9,12,15,18,21,24}, separately for every outcome of this Atom. Fields value,lower,upper,status,reason retain their existing meanings: confirmed-record age-by-era contrasts and ordinary pointwise conditional 95% intervals. These are descriptive timing diagnostics, not additional confirmatory tests, simultaneous path bands, observation-bound intervals, or bias-widened causal trajectories. Reuse the same baseline risk sets, event constructors, era weights and uncertainty rules; do not recenter at rollout, fit a new event-study regression, smooth, interpolate missing quarters, or infer a hazard. The sustained_away and same_partner outcomes describe horizon-specific states and need not be monotone; the other registered cumulative-event probabilities do not make their age-by-era differences monotone. Persistence rules and recognition windows themselves affect visible timing. No difference between time points or domains is tested here, and a pointwise interval first excluding zero does not establish causal onset. Directional main claims still use the registered 20-comparison family at h12/h24 and its observation/bias sets. Retain every quarterly position, displaying missing positions with their scoped reason; a renderer may show an absent row as unavailable but must not invent its scientific disposition. Existing age25_26_placebo, reference-year and leave-one-year diagnostics remain fully reportable in Tables S3a/S3b and the bound aggregate outputs. No activation, local result region, hypothesis, population or output column is changed by this display binding.

Remaining registration fields

The preregistration.protocol field is reproduced in full immediately above; all remaining fields are reproduced below.

```
id: atom-000001
topic: Policy access
atom_result: prereg
atom_strength: null
atom_shape: null
evidence_paths: []
concepts: []
literature: []
bonds: []
preregistration:
  version: 1
  mode: adaptive
```

question: Does the 2021 waiver create a documented exposure contrast and increased use recorded under standard individual first/follow-up
↳ consultation codes?

rationale: 'Question and role: Does the July 2021 regime generate the
↳ intended age-specific entitlement and a measurable change in use recorded under standard individual first/follow-up consultation codes? This consequential access judgment supplies the common interpretation of all relationship experiments. It is not another health-outcome study or an IV first-stage certificate.'

assumption: Registered exposure, observation and counterfactual assumptions are explicit in this protocol and the shared data/identification contract; none has been empirically established.

target_strength: causal

target_shape: comparison

ratings:

- importance: 5
- novelty: 3
- feasibility: 3
- data_advantage: 4
- informativeness: 0.6

tables:

- BEF
- DODSAASG
- SSSY

activation: 'TRUE'

verdicts:

- key: design_gap
 - region: Policy timing, index-person entitlement history or a required primary baseline age cell is contradicted, empty or evidenced
↳ unavailable;
also no uptake contrast due exclusively to required BEF follow-up gaps.
 - says: The chosen policy comparison cannot be evaluated.
- key: code_gap
 - region: Policy chronology and every required baseline age24/25 cell
↳ established;
neither main uptake horizon constructable, each has a required age24/25 service gap, and no required main-age nonservice gap explains the
↳ failure.
Available uptake horizons are adjudicated below and all partial gaps reported.
 - says: Relationship policy contrasts may run, but standard individual
↳ uptake
is unresolved.
- key: uptake_increase
 - region: First available simultaneous B=0 lower uptake limit >0 at either horizon after earlier regions fail.
 - says: At least one billed standard consultation-use contrast increases; report any discordant horizon.
- key: uptake_decrease
 - region: No increase region, and upper uptake limit <0 at either horizon.
 - says: A decrease challenges the intended uptake margin; no therapeutic null follows.
- key: uptake_uncertain
 - region: At least one uptake contrast/point bound available, but neither directional region holds.
 - says: The uptake evidence is inconclusive, including precision
↳ unavailable.
- key: otherwise

```
region: otherwise
says: Unresolved scientific conflict; no additional claim or unregistered
branch.
```

Registered question

Does the 2021 waiver create a documented exposure contrast and increased use recorded under standard individual first/follow-up consultation codes?

Prospective registration. All empirical results and local states are pending.

atom-000002: Administrative recognition

Question and role: Establish whether documented family recognition changes without changes in the original people and their addresses. This independently meaningful shared diagnostic retains its original Atom ID; its result never selects causal endpoints or age bands.

Population and unit: residents turning 24, 25, 26 in each of 2017, 2018, 2019; person-birthday opportunity. Require quarter immediately before and first quarter on/after birthday, with quarter-end birthdays in the post observation. Feb29 uses March1 in nonleap years. Repeated people cluster together. BEF_PNR, FOED_DAG, REFERENCETID give the common inventory. Family component separately needs ADRESSE_ID, MOR_ID, FAR_ID, FAMILIE_ID. Pair component separately needs ADRESSE_ID, E_FAELE_ID, FAMILIE_TYPE, MOR_ID, FAR_ID; AEGTE_ID may provide a source-supported spouse link. PLADS is optional context, never required to establish the direct address diagnostic. Apply dated family semantics and reciprocal identities; no invented historical code map.

Ordered pseudocode: 1. Validate unique person/snapshot and invariant birth-date. Create diagnostic_coverage.csv for every year x age x component (family/partner), before scanning outcomes. Fields year, age, component, opportunities, baseline_unknown, status, reason. Full year coverage requires the preceding December31 and four within-year quarter ends; this certifies every possible birthday bracket, including a quarter with no observed changes. Missing dates/fields retain data_gap coverage rows. A missing baseline bracket cannot silently disappear; the inventory remains incomplete. Baseline_unknown counts identifiable person-birthdays with unresolved eligibility, not the number of entirely unobserved residents. 2. Family risk requires known shared address AND known shared FAMILIE_ID with at least one parent before birthday. Unknown baseline family identity/address is unresolved risk-set membership. Among eligible people, compare the index family ID with those same parents afterward; all necessary current IDs must be known. Family departure=all no longer match. Administrative_only_departure additionally requires the young person's address unchanged and a previously sharing parent's address unchanged/still shared. Missing current parent IDs, absent addresses or death do not establish a mismatch or its absence; unresolved administrative evaluation is None. 3. Partner risk requires reciprocal recognized original identities at a shared address before birthday, with valid semantics. Count recognition loss only if AFTER recognition is known (including known absence of a recognized

pair), `q_after` differs from `q_before`, BOTH original addresses are known and each remains equal to the original shared address. Unmapped family code, missing reciprocity or unavailable address is `None`, not `loss`. `Verified_address_separation` separately compares known original addresses while neither person is known dead. Track `household_membership_change` and `resident_turns18` among those original pair opportunities as descriptive coincidences, never identified causes. 4. Aggregate `diagnostic_rates.csv` for every age and six diagnostics: `family_departure`, `administrative_only_departure`, `pair_recognition_loss_same_address`, `verified_address_separation`, `household_membership_change`, `resident_turns18`. Columns `n` (established pre-birthday opportunities), `count` (confirmed events), `known_n`, `unknown`, `baseline_unknown`, `rate=count/n`, `rate_upper=(count+unknown)/n`, `lower`, `upper`, `status`. `rate/rate_upper` bound event fractions ONLY within the identified denominator; they do not bound unobserved populations. If `n=0` emit `NaN` rates and `data_gap`. For full component/year/baseline coverage and `unknown=0`, compute ordinary cluster-by-person 95% Wald intervals. Otherwise `lower/upper` are `NaN`: no sampling interval that fills unknowns with zero. Figure2 shows confirmed fractions and distinct unknown extensions; baseline/coverage gaps remain labeled. `unknown_linkage` pools the four core evaluation opportunities, not unique people; no sampling CI and no sum with `baseline_unknown`. 5. First-matching state: `data_gap` if no known core evaluation; `artefact_present` if any confirmed `administrative_only_departure` or `pair_recognition_loss_same_address` event; `no_detected_artefact` only when all three years, all three ages and both core components have full inventories, established opportunities and no unresolved evaluations or risk memberships, with no confirmed artefact; `partial` otherwise when at least one core evaluation exists. A positive state always reports missing components; absence is not equivalence or validation of all relationships.

Output `diagnostic_rates.csv`, `diagnostic_coverage.csv`, `disposition.json`; Figure2 (reader Figure S1), Table S5 and `recognition_detail` bind them. No policy hypothesis tests are added. Runtime calls `run_atom('atom-000002',...)` or `diagnostic_atom(...,with_coverage=True)`. Shared keys/joins and statuses below apply only where relevant; this descriptive Atom does not emit effect comparisons.

Shared binding definitions: `docs/protocol/data-contract.md` (fields, effective coding, population clocks, missingness and risk sets), `docs/protocol/identification.md` (exact cell contrast, inference, 20-comparison family and fixed bias scenarios), and `docs/protocol/governance.md`. These documents are incorporated in this protocol; implementation cannot choose alternative definitions. All fields come from the named allowed tables. No observed result exists.

Runtime inputs: certified normalized table DataFrames retaining original field names; metadata with source/period/dictionary provenance; read-only predecessor evidence; explicit writable output directory. Never assume supplied rows, cell counts or dictionary validity from a file name. Construction unit is a baseline person-by-index-year, then quarter history; outputs aggregate only. Resolve duplicates and assert cardinalities before any join. No post-exposure exclusions. Individual missing intervals remain unknown bounds; entire missing required periods are evidenced `data_`

gap. Inaccessible or uncompleted operations give terminal `no_result` and NO registered `_state`. The entry point logs graph or direct dispatch, but direct cannot bypass these requirements.

All effect products also include `baseline.csv` (`index_year`, `age`, `field`, `category`, `n`), with total cohort and sex, municipality, citizenship and recorded-immigration categories; unavailable context remains labeled. All effect products: `effects.csv` rows keyed by outcome, horizon with estimate, lower, upper (confirmed contrast and ordinary 95% interval), `bound_lower`, `bound_upper` (simultaneous missingness interval at $B=0$), `bias1_lower`, `bias1_upper`, `bias2_lower`, `bias2_upper`, `raw_p`, `p_bonf`, `se`, `n`, `clusters_family`, `clusters_birthmonth`, `largest_cluster_share`, `status`, `reason`, `breakdown_bias`, `detectable_contrast`. Estimates and limits are probability differences; plotting converts once to percentage points. `Cells.csv` keys `index_year`, `age`, `outcome`, `horizon` carry `n`, `events`, `unknown`, `competing`, `p_lower`, `p_upper`; no private IDs. `diagnostics.csv` keys `outcome`, `horizon`, `check`, `value`, `lower`, `upper`, `status`, `reason` contains historical age gaps, lead comparisons, age25-versus26 placebo, three leave-one-year contrasts, missing/competing totals and precision restrictions. Optional row-level trajectories and cluster assignments stay in governed intermediates, never export. `disposition.json` records `local_state` or terminal, scoped endpoint failures, upstream states, dispatch mode, dictionaries, code/software hashes and population/exclusion counts. A missing endpoint keeps its row with status and NaN numerical fields; never drops from family 20.

Synthetic verification: `docs/execution/test_reference.py` checks fixed clocks, exact birthdays/leap birthdays, duplicate joins, parent-versus-child moves, recognition losses without separation, loss/death/unknown distinctions, newborn versus older-child recognition, empty cohorts, hand-computable contrasts and bound endpoints, family dependence, missing predecessors, default nonactivation and direct dispatch. Code is a reference implementation under the protocol, not authority to repair scientific ambiguity. Figure renderers receive only these registered plot-ready summaries. No result CSV is shipped with this pre-data registration. Invocation provenance: `run_atom` records a canonical SHA256 of supplied metadata plus separate hashes/presence for the input manifest, delivery certificates, historical family/civil/service dictionaries, certified dictionary periods, fee-week map and its source, billing periods, net-final adapter evidence, death periods, policy chronology and caller construction-accounting manifest. It records Python/package versions, source-code SHA256, input table field/dtype inventories and aggregate row counts, then hashes every emitted aggregate product and indexes construction-accounting outputs. This applies to graph/direct dispatch, scoped boundaries, pending/nonactivated routes and `no_result`. The caller retains source manifests and input-file checksums in governed storage; missing caller provenance is explicitly listed, never invented. No private row or credential is exported. `docs/execution/README.md` specifies the caller interface and `test_provenance_and_pairs.py` verifies metadata-only changes.

Optional death evidence: DODSAASG2022 is an extract vintage for the documented 2002–2022 event register. A supplied DODSAASG DataFrame, including a certified empty extract, requires `death_periods` entries `start/end/source`. Validate

every actual PNR/D_DODSDATO against the certified event periods within 2002–2022, with unique consistent dates. Uncompleted certification or out-of-certificate rows require no_result and a governed adapter; do not infer survival from absent optional evidence, extrapolate beyond the certified periods or add another register. Absence of DODSAASG leaves BEF observation rules unchanged and exits unresolved.

Remaining registration fields

The preregistration.protocol field is reproduced in full immediately above; all remaining fields are reproduced below.

```
id: atom-000002
topic: Administrative recognition
atom_result: prereg
atom_strength: null
atom_shape: null
evidence_paths: []
concepts: []
literature: []
bonds: []
preregistration:
  version: 1
  mode: adaptive
  question: Do administrative family and partner changes occur without changes
    in people or shared addresses?
  rationale: 'Question and role: How much apparent residential/partnership
    change in the delivered historical population is administrative
    ↪ reclassification
    with unchanged persons/addresses? This is an independently interpretable
    measurement experiment shared by residence and union questions; routine
    joins remain within it and the substantive Atoms.'
  assumption: Registered exposure, observation and counterfactual assumptions
    are explicit in this protocol and the shared data/identification contract;
    none has been empirically established.
  target_strength: descriptive
  target_shape: comparison
  ratings:
    importance: 5
    novelty: 3
    feasibility: 3
    data_advantage: 4
    informativeness: 0.6
  tables:
    - BEF
    - DODSAASG
  activation: 'TRUE'
  verdicts:
    - key: data_gap
      region: No core address/person diagnostic constructable.
      says: No empirical reclassification assessment.
    - key: artefact_present
      region: At least one confirmed administrative-only family departure or
        recognition loss with unchanged shared address.
      says: A family-code-only event can be false; report each denominator and
        missing component.
    - key: no_detected_artefact
      region: Both diagnostic families fully constructable; all
        ↪ administrative-only
```

```

counts zero.
says: No artefact detected in these histories; not equivalence or proof
of complete recognition.
- key: partial
region: At least one diagnostic constructable, none confirms artefact,
another component unresolved.
says: Only the reported measurement scope is assessed.
- key: otherwise
region: otherwise
says: Unresolved scientific conflict; no additional claim or unregistered
branch.

```

Registered question

Do administrative family and partner changes occur without changes in people or shared addresses?

Prospective registration. All empirical results and local states are pending.

atom-000003: Residential trajectories

Question and role: Does the regime shift departure, sustained residence apart, and return among separately fixed baseline parental-residence strata? This one residential experiment preserves initiation and reversibility without treating return as the negative of leaving or splitting each outcome into an Atom.

Population and fields: common cohorts; BEF_PNR, FOED_DAG, REFERENCEID, MOR_ID, FAR_ID, ADRESSE_ID, BOP_VFRA; optional documented death date. Freeze parent identities at B_c; later link corrections cannot redefine the denominator. Use contemporaneous addresses of these parents. Required joins and quarters follow the data contract. A parent moving into the young person's home is not a return; both parties jointly moving from apart to a new common address is a joint relocation (reported separately), not the strict return endpoint.

Endpoints at both horizons, accumulated since B_c: - leave: baseline co-residents. First quarter changing from known co-residence with a baseline parent to known residence apart, with the young person's address changed from the previous known address AND different from every observed baseline parent, with parent-comparison status fully known. A parent alone moving away, familyID change, legal-parent loss or bereavement is not leave. - sustained_away: baseline co-residents. A qualifying leave has occurred by H; each of the four consecutive quarters ending H has a known address different from all observed baseline parents. This is persistent registered residence apart at the horizon, not necessarily a first-ever departure and not financial independence. A temporary earlier return does not prevent a later four-quarter sustained spell. - return: baseline-away stratum fixed using all four pre-baseline quarters. A subsequent transition from known residence apart, with a young-person move to an address occupied by at least one of the baseline-linked parents at the preceding AND current snapshot; baseline-independent people with no return stay in the denominator. Unknown prior/current address prevents strict confirmation. Parental moves and joint relocation receive separate diagnostic flags; they are not strict returns.

Pseudocode: load all baseline risk sets before follow-up; scan consecutive quarters in order; maintain event_lower/event_upper and separate unknown and competing indicators; a single unknown interval can conceal a cumulative move but cannot be imputed as one. For sustained-away, confirmed leave plus all four final quarters required; final known co-residence gives zero, insufficient final quarters or unknown parent whereabouts gives [0,1]. For already confirmed leave/return keep cumulative one even after later death/exit. For all other gaps preserve [0,1]; report no complete-case estimator. Compute all six contrasts with the shared estimator and the entire registered diagnostic/sensitivity set. Parent death alone never triggers an event. Record young-move, parent-only, joint-move, death/exit, unknown counts in diagnostics.csv.

Inference and result: 6 of family20, two-sided directions, no welfare or equivalence region. Use integrated state function below, retaining every endpoint's distinct sign and precision. A confirmed residential contrast without demonstrated standard consultation uptake is a policy/observation contrast with unresolved therapy mechanism; it is not a therapeutic null. Do not infer a housing-support deficit from unchanged residence. Figure3 consumes all relationship effect rows from this and the other outcome Atoms, grouped by substantive domain. Code docs/execution/reference.py: run_atom('atom-000003', ...).

Integrated outcome result partition, evaluated in the listed first-matching order: data_gap when no registered endpoint/horizon is constructable; mixed_directions when at least one B=2pp simultaneous interval is wholly positive AND another is wholly negative; bounded_shift when at least one such interval excludes zero and the previous mixed case does not apply; sensitive_shift when no B=2 interval excludes zero but at least one B=0 interval does; inconclusive when estimates/point bounds exist but none meets those regions, including precision_unavailable; otherwise for an evidenced unexpected scientific conflict. Each available endpoint has its own direction, gap/precision state and bias-breakdown output. Missing components do not erase independent results, and any partial coverage is mandatory in the main claim. None of these local states certifies causal identification, equivalence, wellbeing or a therapy mechanism. No finite bias allowance has been verified; report the unbounded-identification limitation alongside every conditional direction claim.

Shared binding definitions: docs/protocol/data-contract.md (fields, effective coding, population clocks, missingness and risk sets), docs/protocol/identification.md (exact cell contrast, inference, 20-comparison family and fixed bias scenarios), and docs/protocol/governance.md. These documents are incorporated in this protocol; implementation cannot choose alternative definitions. All fields come from the named allowed tables. No observed result exists.

Runtime inputs: certified normalized table DataFrames retaining original field names; metadata with source/period/dictionary provenance; read-only predecessor evidence; explicit writable output directory. Never assume supplied rows, cell counts or dictionary validity from a file name. Construction unit is a baseline person-by-index-year, then quarter history; outputs aggregate only. Resolve duplicates and assert cardinalities before any join. No post-exposure exclusions. Individual missing intervals remain unknown bounds; entire missing required periods are evidenced data_

gap. Inaccessible or uncompleted operations give terminal `no_result` and NO registered `_state`. The entry point logs graph or direct dispatch, but direct cannot bypass these requirements.

All effect products also include `baseline.csv` (`index_year`, `age`, `field`, `category`, `n`), with total cohort and sex, municipality, citizenship and recorded-immigration categories; unavailable context remains labeled. All effect products: `effects.csv` rows keyed by outcome, horizon with estimate, lower, upper (confirmed contrast and ordinary 95% interval), `bound_lower`, `bound_upper` (simultaneous missingness interval at $B=0$), `bias1_lower`, `bias1_upper`, `bias2_lower`, `bias2_upper`, `raw_p`, `p_bonf`, `se`, `n`, `clusters_family`, `clusters_birthmonth`, `largest_cluster_share`, `status`, `reason`, `breakdown_bias`, `detectable_contrast`. Estimates and limits are probability differences; plotting converts once to percentage points. `Cells.csv` keys `index_year`, `age`, `outcome`, `horizon` carry `n`, `events`, `unknown`, `competing`, `p_lower`, `p_upper`; no private IDs. `diagnostics.csv` keys `outcome`, `horizon`, `check`, `value`, `lower`, `upper`, `status`, `reason` contains historical age gaps, lead comparisons, age25-versus26 placebo, three leave-one-year contrasts, missing/competing totals and precision restrictions. Optional row-level trajectories and cluster assignments stay in governed intermediates, never export. `disposition.json` records `local_state` or terminal, scoped endpoint failures, upstream states, dispatch mode, dictionaries, code/software hashes and population/exclusion counts. A missing endpoint keeps its row with `status` and NaN numerical fields; never drops from family 20.

Synthetic verification: `docs/execution/test_reference.py` checks fixed clocks, exact birthdays/leap birthdays, duplicate joins, parent-versus-child moves, recognition losses without separation, loss/death/unknown distinctions, newborn versus older-child recognition, empty cohorts, hand-computable contrasts and bound endpoints, family dependence, missing predecessors, default nonactivation and direct dispatch. Code is a reference implementation under the protocol, not authority to repair scientific ambiguity. Figure renderers receive only these registered plot-ready summaries. No result CSV is shipped with this pre-data registration.

Scoped execution and reporting: Component prerequisites are evaluated separately. `component_gaps.csv` keys `index_year`, `age`, `horizon`, `outcome`, `status`, `reason` retain each established missing requirement; no affected endpoint row is dropped from `effects.csv` or the fixed family20. A missing return-history quarter does not block leave/sustained_away; a missing inferred-pair field/prior quarter does not block legal endpoints. Whole follow-up gaps still block every endpoint requiring that particular period. Individual unknown risk-set membership is separately tabulated, never selected using later outcomes. `disposition.json` records endpoint statuses and predecessor states/terminals. A predecessor that has finished `no_result` closes its mandatory dependent route as `not_activated`; an unfinished predecessor stays pending. Direct dispatch bypasses only activation and must still establish the fixed policy, all primary baseline age cells and each endpoint's scientific inputs. Test definitions are in `test_reference.py` and `test_observation_semantics.py`. No synthetic data are shipped.

Return-history validation is confined to return. Missing any of the four baseline-away snapshots emits an unavailable return row and a `return_history_unavailable` flag; it never removes a supported baseline-co-resident departure or sustained-away

row. A known baseline apart status without fully observed prior history is not silently redefined as the return risk set. Invocation provenance: `run_atom` records a canonical SHA256 of supplied metadata plus separate hashes/presence for the input manifest, delivery certificates, historical family/civil/service dictionaries, certified dictionary periods, fee-week map and its source, billing periods, net-final adapter evidence, death periods, policy chronology and caller construction-accounting manifest. It records Python/package versions, source-code SHA256, input table field/dtype inventories and aggregate row counts, then hashes every emitted aggregate product and indexes construction-accounting outputs. This applies to graph/direct dispatch, scoped boundaries, pending/nonactivated routes and `no_result`. The caller retains source manifests and input-file checksums in governed storage; missing caller provenance is explicitly listed, never invented. No private row or credential is exported. `docs/execution/README.md` specifies the caller interface and `test_provenance_and_pairs.py` verifies metadata-only changes.

Optional death evidence: DODSAASG2022 is an extract vintage for the documented 2002–2022 event register. A supplied DODSAASG DataFrame, including a certified empty extract, requires `death_periods` entries `start/end/source`. Validate every actual PNR/D_DODSDATO against the certified event periods within 2002–2022, with unique consistent dates. Uncompleted certification or out-of-certificate rows require `no_result` and a governed adapter; do not infer survival from absent optional evidence, extrapolate beyond the certified periods or add another register. Absence of DODSAASG leaves BEF observation rules unchanged and exits unresolved.

Blueprint amendment, registered before data: add a descriptive residential round trip within this same experiment. The reader question is whether departure is followed by return among the ORIGINAL baseline co-residents. This differs from the main return endpoint’s original baseline-away population and must never be presented as its complement. No additional main effect contrast or hypothesis test is registered.

Binding supplementary construction: use the same baseline co-resident risk set, frozen parents, cohorts $c=\{2017,2018,2019,2021\}$, ages $\{24,25\}$, B_c and $H_{c,h}$ for $h=\{12,24\}$. For each person, scan all consecutive quarters from B to H. `round_trip_lower=1` only if a qualifying leave is confirmed and a later strict return is confirmed, with the young person moving to a baseline parent’s address occupied by that parent at BOTH the preceding and current return snapshot. The return must be in a later observed interval than the leave; a single interval cannot confirm both. Death before any possible completed sequence closes future opportunity, but does not erase an earlier confirmed sequence. Keep earlier unresolved intervals unresolved. Parent-only moves, joint relocations and mere family/partner reclassification are not strict events. `round_trip_upper=1` if a completed sequence cannot be ruled out under the observation rules; otherwise zero. A gap cannot prove that two events occurred, and quarterly absence of a detected round trip is not proof that no within-quarter move occurred. The target is a sequentially detectable registered round trip, not every physical move. If the complete required quarterly path establishes no qualifying sequence, `upper=0`. A confirmed sequence remains one after later exit/death. Emit no complete-case or leavers-only rate.

Pseudocode: retain a set of feasible states {home_no_leave, away_after_leave, returned_after_leave}; initial state home_no_leave; update using allowed known transitions and unresolved intervals, without deleting feasible paths after an unknown interval. Known terminal death permits no new event afterward. The lower indicator is an explicitly observed qualifying sequence, not a sequence imputed by this state set. The upper indicator is whether a qualifying sequence is feasible. Preserve inequality $\text{round_trip_lower} \leq \text{leave_lower}$ and $\text{round_trip_upper} \leq \text{leave_upper}$. Marginal sustained-away and round-trip can both be one after leave-return-leave; never force them into exclusive categories.

Output residential_paths.csv: keys index_year,age,horizon,measure with measure in {leave,sustained_away,leave_then_return}; columns n,count_lower,count_upper,p_lower,p_upper,unknown,baseline_candidates,baseline_unknown,status,reason.

All three measures use the identical original co-resident denominator per cell. For known membership $n=0$ use empty_risk_set with missing fractions; for unavailable required periods use data_gap and missing numbers. Unknown baseline membership is outside these fractions and must be tabulated. Counts are person-by-index-year, not moves. Each lower/upper fraction divides by n ; unknown=count_upper-count_lower. These are finite-cohort descriptions and observation bounds, without sampling intervals, significance tests, policy attribution or inclusion in family20. All 422×3 rows are required with explicit statuses. The new description does not change this Atom's main-result partition; its scoped disposition is separately mandatory even if all main effect precision is unavailable. See docs/execution/interfaces.md for final engineering and tests.

Editorial timing specification, 9 September 2026 UTC / 8 September 2026 America/Chicago: the quarterly comparisons already incorporated from docs/protocol/identification.md are displayed over their registered clock. Figure4 (reader Figure3) binds diagnostics.csv, check=trajectory_lead for horizon in {-9,-6,-3,0} and check=trajectory_curve for horizon in {3,6,9,12,15,18,21,24}, separately for every outcome of this Atom. Fields value,lower,upper,status,reason retain their existing meanings: confirmed-record age-by-era contrasts and ordinary pointwise conditional 95% intervals. These are descriptive timing diagnostics, not additional confirmatory tests, simultaneous path bands, observation-bound intervals, or bias-widened causal trajectories. Reuse the same baseline risk sets, event constructors, era weights and uncertainty rules; do not recenter at rollout, fit a new event-study regression, smooth, interpolate missing quarters, or infer a hazard. The sustained_away and same_partner outcomes describe horizon-specific states and need not be monotone; the other registered cumulative-event probabilities do not make their age-by-era differences monotone. Persistence rules and recognition windows themselves affect visible timing. No difference between time points or domains is tested here, and a pointwise interval first excluding zero does not establish causal onset. Directional main claims still use the registered 20-comparison family at h12/h24 and its observation/bias sets. Retain every quarterly position, displaying missing positions with their scoped reason; a renderer may show an absent row as unavailable but must not invent its scientific disposition. Existing age25_26_placebo, reference-year and leave-one-year diagnostics remain fully reportable in Tables S3a/S3b and the bound aggregate outputs. No

activation, local result region, hypothesis, population or output column is changed by this display binding.

Remaining registration fields

The `preregistration.protocol` field is reproduced in full immediately above; all remaining fields are reproduced below.

```
id: atom-000003
topic: Residential trajectories
atom_result: prereg
atom_strength: null
atom_shape: null
evidence_paths: []
concepts: []
literature: []
bonds: []
preregistration:
  version: 1
  mode: adaptive
  question: Does the age-targeted access regime change departure, sustained
    residence apart and return to parents?
  rationale: 'Question and role: Does the regime shift departure, sustained
    residence apart, and return among separately fixed baseline
    ↪ parental-residence
    strata? This one residential experiment preserves initiation and
    ↪ reversibility
    without treating return as the negative of leaving or splitting each
    ↪ outcome
    into an Atom.'
  assumption: Registered exposure, observation and counterfactual assumptions
    are explicit in this protocol and the shared data/identification contract;
    none has been empirically established.
  target_strength: causal
  target_shape: comparison
  ratings:
    importance: 5
    novelty: 3
    feasibility: 3
    data_advantage: 4
    informativeness: 0.6
  tables:
    - BEF
    - DODSAASG
  activation: done(atom-000001) AND ((state(atom-000001) == "uptake_increase"
    OR state(atom-000001) == "uptake_decrease" OR state(atom-000001) ==
    ↪ "uptake_uncertain"
    OR state(atom-000001) == "code_gap") AND done(atom-000002))
  verdicts:
    - key: data_gap
      region: No endpoint/horizon constructable.
      says: This trajectory question is unresolved under the supplied data.
    - key: mixed_directions
      region: At least one positive and at least one negative B=2pp simultaneous
        interval.
      says: Registered margins shift in different directions conditional on
        the bias limit; no common welfare sign.
    - key: bounded_shift
      region: No mixed region, at least one B=2pp interval excludes zero.
```

- says: At least one registered trajectory shift survives the stated
 - ↪ hypothetical bias allowance.
- key: sensitive_shift
 - region: No B=2pp interval excludes zero, but a B=0 interval does.
 - says: Directional evidence depends on stronger age-gap stability than the fixed 2pp scenario.
- key: inconclusive
 - region: Estimates/point bounds exist; no earlier direction region,
 - ↪ including unavailable precision.
 - says: Uncertainty does not resolve a directional policy contrast; no
 - ↪ equivalence claim.
- key: otherwise
 - region: otherwise
 - says: Unresolved scientific conflict; no additional claim or unregistered branch.

Registered question

Does the age-targeted access regime change departure, sustained residence apart and return to parents?

All empirical results are pending. The supplementary round-trip description is part of this residential experiment.

atom-000004: Partnership trajectories

Question and role: Does the regime shift entry into observable unions or continuity/dissolution of unions already present? Entry and continuity form one coherent partnership trajectory experiment with distinct baseline risk sets; no stability regression among post-policy entrants.

Population/fields: common cohorts, BEF_PNR, FOED_DAG, REPERENCETID, ADRESSE_ID, E_FAELE_ID, AEGTE_ID, CIVST, CIV_VFRA, FAMILIE_TYPE plus parent links for kin checks; dated family/civil dictionaries. Co-resident recognized pairs require reciprocal same partner identities, same address and a source-supported family category; legal spouse may live elsewhere and is separately tracked. Same-sex legal marriages/registered partnerships are included when coded; the opposite-sex childless algorithm cannot be expanded to missing same-sex unions. Keep recognition type/sex composition counts; no claim about all romance. Missing/ambiguous family codes block inferred components but do not block source-valid legal components.

Endpoints at h12, h24 since B_c: - union_entry: baseline observably unpartnered for two snapshots. First reciprocal recognized pair sharing an address when those two people had known different addresses in the preceding snapshot. A shared child's registration, changed roommate composition or family coding on an already shared address is recognition-only, not this endpoint. New incoming partner missing in previous snapshot creates [0,1]. An initial interval of uncertain recognition cannot be treated as no romance. - separation: baseline partnered with the same person in two snapshots. First transition to known different addresses while both original people remain observed;

if death of an original pair member is established no new separation is assigned; the index person's civil widowhood alone is insufficient. Recognition can disappear while same address persists: keep continuity, not separation. A change to a new partner at the same household address is separately recognition/identity change, not a verified residential split. - same_partner: baseline partnered. At H both original people share a known address; this identity-based co-residence endpoint can be one even after an earlier separation/reunion. Death/known non-co-residence is zero; missing whereabouts is [0,1]. It is not relationship quality or uninterrupted intimacy. - legal_entry: no current legal union at B_c. First transition to a married/registered-partner CIVST code with identified spouse and compatible CIV_VFRA in the observed interval. Includes supported same-sex unions. Unknown previous civil code or an unexplained stale date is unresolved, not an inferred event. - legal_dissolution: legal union at B_c. First observed divorced/dissolved registered-partnership code supported by civil-date interval, tracking the baseline spouse; widowhood is competing. A disappeared spouse ID without a supported civil event is not divorce. A later remarriage does not erase a confirmed dissolution.

Baseline individuals are the primary target, including both index-age members of a dyad if both qualify; the resulting estimand is a person-average change in a shared arrangement, not a dyad count or independent replication. Count each baseline dyad once in descriptive dyad counts, and preserve connected-family inference to account for shared outcomes. Report baseline partner age and waiver-history strata descriptively; do not condition on later partner identity, treatment or survival. No partner-treatment effect is identified. A policy with spillovers to spouses is part of the regime contrast and its bias allowance.

Pseudocode: construct recognized risk sets from B_c and prior quarter, and legal risk sets from B_c only; freeze partner/spouse; scan every adjacent pair of quarters preserving identities; assign flags for strict entry, recognition-only entry, address split, recognition-only loss, reunion, new-identity recognition, legal divorce and widowhood; accumulate binary endpoints and unknown bounds as above; fit all ten shared contrasts and fixed age/year/lead/bias diagnostics. If only legal component is valid, return legal rows and unavailable inferred rows with reason; do not rename legal marriages as all partnerships. No post-treatment subgroup analyses. Figures3/4 use the bound intervals and diagnostic contrasts; full cell counts and historical-recognition display remain in SI. Code docs/execution/reference.py: run_atom('atom-000004', ...).

Integrated outcome result partition, evaluated in the listed first-matching order: data_gap when no registered endpoint/horizon is constructable; mixed_directions when at least one B=2pp simultaneous interval is wholly positive AND another is wholly negative; bounded_shift when at least one such interval excludes zero and the previous mixed case does not apply; sensitive_shift when no B=2 interval excludes zero but at least one B=0 interval does; inconclusive when estimates/point bounds exist but none meets those regions, including precision_unavailable; otherwise for an evidenced unexpected scientific conflict. Each available endpoint has its own direction, gap/precision state and bias-breakdown output. Missing components do not erase independent results, and any partial coverage is mandatory in the main

claim. None of these local states certifies causal identification, equivalence, wellbeing or a therapy mechanism. No finite bias allowance has been verified; report the unbounded-identification limitation alongside every conditional direction claim.

Shared binding definitions: docs/protocol/data-contract.md (fields, effective coding, population clocks, missingness and risk sets), docs/protocol/identification.md (exact cell contrast, inference, 20-comparison family and fixed bias scenarios), and docs/protocol/governance.md. These documents are incorporated in this protocol; implementation cannot choose alternative definitions. All fields come from the named allowed tables. No observed result exists.

Runtime inputs: certified normalized table DataFrames retaining original field names; metadata with source/period/dictionary provenance; read-only predecessor evidence; explicit writable output directory. Never assume supplied rows, cell counts or dictionary validity from a file name. Construction unit is a baseline person-by-index-year, then quarter history; outputs aggregate only. Resolve duplicates and assert cardinalities before any join. No post-exposure exclusions. Individual missing intervals remain unknown bounds; entire missing required periods are evidenced data_gap. Inaccessible or uncompleted operations give terminal no_result and NO registered_state. The entry point logs graph or direct dispatch, but direct cannot bypass these requirements.

All effect products also include baseline.csv (index_year, age, field, category, n), with total cohort and sex, municipality, citizenship and recorded-immigration categories; unavailable context remains labeled. All effect products: effects.csv rows keyed by outcome, horizon with estimate, lower, upper (confirmed contrast and ordinary 95% interval), bound_lower, bound_upper (simultaneous missingness interval at B=0), bias1_lower, bias1_upper, bias2_lower, bias2_upper, raw_p, p_bonf, se, n, clusters_family, clusters_birthmonth, largest_cluster_share, status, reason, breakdown_bias, detectable_contrast. Estimates and limits are probability differences; plotting converts once to percentage points. Cells.csv keys index_year, age, outcome, horizon carry n, events, unknown, competing, p_lower, p_upper; no private IDs. diagnostics.csv keys outcome, horizon, check, value, lower, upper, status, reason contains historical age gaps, lead comparisons, age25-versus26 placebo, three leave-one-year contrasts, missing/competing totals and precision restrictions. Optional row-level trajectories and cluster assignments stay in governed intermediates, never export. disposition.json records local_state or terminal, scoped endpoint failures, upstream states, dispatch mode, dictionaries, code/software hashes and population/exclusion counts. A missing endpoint keeps its row with status and NaN numerical fields; never drops from family 20.

Synthetic verification: docs/execution/test_reference.py checks fixed clocks, exact birthdays/leap birthdays, duplicate joins, parent-versus-child moves, recognition losses without separation, loss/death/unknown distinctions, newborn versus older-child recognition, empty cohorts, hand-computable contrasts and bound endpoints, family dependence, missing predecessors, default nonactivation and direct dispatch. Code is a reference implementation under the protocol, not authority to repair scientific ambiguity. Figure renderers receive only these registered plot-ready summaries. No result CSV is shipped with this pre-data registration.

Scoped execution and reporting: Component prerequisites are evaluated separately. `component_gaps.csv` keys `index_year`, `age`, `horizon`, `outcome`, `status`, `reason` retain each established missing requirement; no affected endpoint row is dropped from `effects.csv` or the fixed `family20`. A missing return-history quarter does not block `leave/sustained_away`; a missing inferred-pair field/prior quarter does not block legal endpoints. Whole follow-up gaps still block every endpoint requiring that particular period. Individual unknown risk-set membership is separately tabulated, never selected using later outcomes. `disposition.json` records `endpoint_statuses` and predecessor states/terminals. A predecessor that has finished `no_result` closes its mandatory dependent route as `not_activated`; an unfinished predecessor stays pending. Direct dispatch bypasses only activation and must still establish the fixed policy, all primary baseline age cells and each endpoint's scientific inputs. Test definitions are in `test_reference.py` and `test_observation_semantics.py`. No synthetic data are shipped.

Union histories: freeze baseline recognized partner and legal spouse independently. For baseline legal dissolution, require the immediately preceding observed married/registered status to name that baseline spouse plus a dated current divorce/dissolution. A prior widowhood or certified death is absorbing for that baseline union: later remarriage and another union's divorce cannot count. Once baseline divorce is confirmed retain one permanently and count its `legal_divorce` flag once. An unexplained switch to another spouse without observed dissolution gives an unresolved baseline-union history, never the later union's divorce. A dated valid dissolution before a later death remains confirmed, including within the same observed quarter. For recognized separation, certified death of either original person or a personally and temporally matched widowhood transition establishing the original partner's death prevents new separation; earlier confirmed separation stays one. Endpoint `same_partner` after that competing event is zero, not a resurrection based on stale later links.

Construction flags: `recognition_only_entry` and `recognition_only_loss` require known recognition; unknown meaning gets `recognition_unresolved`. `address_split` flags each known-apart quarter before a competing event; reunion flags first known joint-address quarter after a known-apart spell and resets until another split. `new_identity_recognition` flags a recognized nonbaseline partner identity different from the preceding known recognition; a continued same new identity is not counted repeatedly. `legal_divorce` occurs once per baseline union; `baseline_union_competing` and `baseline_union_identity_unresolved` describe legal attrition. `construction_flags.csv` keys `index_year`, `age`, `horizon`, `flag` carry count, `denominator`, `unit=person_quarter_opportunities`, `status`. Counts are flagged person-interval evaluations, never unique couples; `denominator` is the corresponding fixed entry/recognized-pair/legal-union population times $4+h/3$ intervals. Companion `diagnostics.csv` preserves the same flags, baseline risk flags and ascertainment limits. Missing component histories produce NaN counts, not zero.

Baseline partner exposure: for each fixed index cohort and relation recognized/legal, use only the partner identified at B (recognized relation additionally stable at preceding quarter). Determine that person's age on R from their B-row FOED DAG. Freeze age bands `under18`, `18_20`, `21_22`, `23_24`, `25plus`, `unknown`. Potential prior new-referral days run 2018-07-01 through R-1 under actual dated waivers; new days run

R through H12. Classify never (both zero), prior_only, new_only, prior_and_new, unknown (missing birthdate/partner row). Missing partner data are not an unexposed stratum. Do not select or adjust for partners formed after baseline. partner_exposure.csv keys index_year, age, relationship, partner_age_band, waiver_history contain n_index, n_dyads, denominator, share, status, with explicit zero cells only after valid component processing. For descriptive dyads use sorted unordered original person pair and count once per cohort/relation. baseline_dyads.csv keys index_year, relationship give n_index, n_dyads, baseline_unknown, status, reason; do not sum shared dyads across age strata, years or overlapping recognized/legal contexts. pair_composition.csv adds observed recognition_type and same_recorded_sex/different_recorded_sex/unknown counts (not sexual orientation). These are ascertainment/exposure descriptions with no partner-treatment test, new subgroup estimator or inference claim. Tables S6 and S8 and their narrative slots bind the products; full fixed-cell ledgers remain governed supplementary evidence. In partner_exposure.csv, baseline_dyads.csv, pair_composition.csv and construction_flags.csv, unknown baseline family/civil semantics never create observed zero counts. Known partner/risk subsets retain descriptive values with status partial, baseline_unknown and reason. Wholly unresolved membership yields missing counts/denominators and data_gap; a verified empty population alone yields descriptive zero. Legal components remain independent of absent family semantics. Flags are counts per fixed risk-set person-quarter opportunities, not incidence rates among selected continuing couples. test_scoped_boundaries.py verifies wholly unknown, partially known and known-empty populations.

Invocation provenance: run_atom records a canonical SHA256 of supplied metadata plus separate hashes/presence for the input manifest, delivery certificates, historical family/civil/service dictionaries, certified dictionary periods, fee-week map and its source, billing periods, net-final adapter evidence, death periods, policy chronology and caller construction-accounting manifest. It records Python/package versions, source-code SHA256, input table field/dtype inventories and aggregate row counts, then hashes every emitted aggregate product and indexes construction-accounting outputs. This applies to graph/direct dispatch, scoped boundaries, pending/nonactivated routes and no_result. The caller retains source manifests and input-file checksums in governed storage; missing caller provenance is explicitly listed, never invented. No private row or credential is exported. docs/execution/README.md specifies the caller interface and test_provenance_and_pairs.py verifies metadata-only changes.

Optional death evidence: DODSAASG2022 is an extract vintage for the documented 2002–2022 event register. A supplied DODSAASG DataFrame, including a certified empty extract, requires death_periods entries start/end/source. Validate every actual PNR/D_DODSDATO against the certified event periods within 2002–2022, with unique consistent dates. Uncompleted certification or out-of-certificate rows require no_result and a governed adapter; do not infer survival from absent optional evidence, extrapolate beyond the certified periods or add another register. Absence of DODSAASG leaves BEF observation rules unchanged and exits unresolved.

Pair-specific widowhood: recognized baseline partner q1 and baseline legal spouse are separate identities. matched_widowhood requires prior CIVST married/registered

with prior AEGTE_ID=q1, current CIVST widowed, and CIV_VFRA strictly after the prior snapshot and on/before current snapshot. Pre-existing widowhood or a named different legal spouse never establishes q1's death. Missing prior identity/status or date is unresolved, flagged pair_widowhood_unresolved in diagnostic accounting. It does not override directly known addresses: retained co-residence or actual address separation remains evidence about the original pair; absent addresses give [0, 1]. A certified death of either original member is absorbing for recognized-pair separation and endpoint continuity. Keep the legal-union competing-event rule separate. widowhood_or_death in construction_flags.csv/TableS8 now refers only to established original-pair competing events, not all widowhood statuses. No new outcome, population or hypothesis is introduced.

Editorial timing specification, 9 September 2026 UTC / 8 September 2026 America/Chicago: the quarterly comparisons already incorporated from docs/protocol/identification.md are displayed over their registered clock. Figure4 (reader Figure3) binds diagnostics.csv, check=trajectory_lead for horizon in {-9,-6,-3,0} and check=trajectory_curve for horizon in {3,6,9,12,15,18,21,24}, separately for every outcome of this Atom. Fields value,lower,upper,status,reason retain their existing meanings: confirmed-record age-by-era contrasts and ordinary pointwise conditional 95% intervals. These are descriptive timing diagnostics, not additional confirmatory tests, simultaneous path bands, observation-bound intervals, or bias-widened causal trajectories. Reuse the same baseline risk sets, event constructors, era weights and uncertainty rules; do not recenter at rollout, fit a new event-study regression, smooth, interpolate missing quarters, or infer a hazard. The sustained_away and same_partner outcomes describe horizon-specific states and need not be monotone; the other registered cumulative-event probabilities do not make their age-by-era differences monotone. Persistence rules and recognition windows themselves affect visible timing. No difference between time points or domains is tested here, and a pointwise interval first excluding zero does not establish causal onset. Directional main claims still use the registered 20-comparison family at h12/h24 and its observation/bias sets. Retain every quarterly position, displaying missing positions with their scoped reason; a renderer may show an absent row as unavailable but must not invent its scientific disposition. Existing age25_26_placebo, reference-year and leave-one-year diagnostics remain fully reportable in Tables S3a/S3b and the bound aggregate outputs. No activation, local result region, hypothesis, population or output column is changed by this display binding.

Remaining registration fields

The preregistration.protocol field is reproduced in full immediately above; all remaining fields are reproduced below.

```
id: atom-000004
topic: Partnership trajectories
atom_result: prereg
atom_strength: null
atom_shape: null
evidence_paths: []
concepts: []
```

```

literature: []
bonds: []
preregistration:
  version: 1
  mode: adaptive
  question: Does the age-targeted access regime change observable union entry
    and continuity of baseline partnerships?
  rationale: 'Question and role: Does the regime shift entry into observable
    unions or continuity/dissolution of unions already present? Entry and
    continuity form one coherent partnership trajectory experiment with
    ↪ distinct
    baseline risk sets; no stability regression among post-policy entrants.'
  assumption: Registered exposure, observation and counterfactual assumptions
    are explicit in this protocol and the shared data/identification contract;
    none has been empirically established.
  target_strength: causal
  target_shape: comparison
  ratings:
    importance: 5
    novelty: 3
    feasibility: 3
    data_advantage: 4
    informativeness: 0.6
  tables:
    - BEF
    - DODSAASG
  activation: done(atom-000001) AND ((state(atom-000001) == "uptake_increase"
    OR state(atom-000001) == "uptake_decrease" OR state(atom-000001) ==
    ↪ "uptake_uncertain"
    OR state(atom-000001) == "code_gap") AND done(atom-000002))
  verdicts:
    - key: data_gap
      region: No endpoint/horizon constructable.
      says: This trajectory question is unresolved under the supplied data.
    - key: mixed_directions
      region: At least one positive and at least one negative B=2pp simultaneous
        interval.
      says: Registered margins shift in different directions conditional on
        the bias limit; no common welfare sign.
    - key: bounded_shift
      region: No mixed region, at least one B=2pp interval excludes zero.
      says: At least one registered trajectory shift survives the stated
        ↪ hypothetical
        bias allowance.
    - key: sensitive_shift
      region: No B=2pp interval excludes zero, but a B=0 interval does.
      says: Directional evidence depends on stronger age-gap stability than
        the fixed 2pp scenario.
    - key: inconclusive
      region: Estimates/point bounds exist; no earlier direction region,
        ↪ including
        unavailable precision.
      says: Uncertainty does not resolve a directional policy contrast; no
        ↪ equivalence
        claim.
    - key: otherwise
      region: otherwise
      says: Unresolved scientific conflict; no additional claim or unregistered
        branch.

```

Registered question

Does the age-targeted access regime change observable union entry and continuity of baseline partnerships?

Prospective registration. All empirical results and local states are pending.

atom-000005: Recorded parenthood

Question and role: Does the regime shift transition into newborn-linked recorded parenthood among baseline residents without an observed child link in the fixed history? This distinct long-commitment question is not reducible to partnership or residential prevalence. It covers the requested family-formation domain while explicitly leaving true first biological/lifetime parenthood unsupported.

Population/fields: common cohorts, BEF index PNR, FOED_DAG, REFERENCEID and all child PNR, FOED_DAG, MOR_ID, FAR_ID snapshots, including non-co-resident children. Require the data-contract five December plus four quarterly pre-baseline histories and observation of the index person throughout these prior references. This is pre-exposure ascertainment selection and limits transport to consistently observed residents; tabulate exclusions by age/era. No selection on subsequent pregnancy, partnering, treatment or newborn survival. Missing child-history delivery blocks this risk set; no BOERNFB, household child count, LPR birth substitute or shortened lookback.

Operational endpoint parenthood at h12, h24: index person has a parent link to a child with FOED_DAG strictly after B_c and on/before H_c, h, and that parent link appears in one of the first TWO quarter-end snapshots on/after birth. Link time is the first observed parent recognition; birth date sets the newborn window. These dates must not be conflated. Require those two quarters to be supplied even for a birth near H. Existing children newly linked, links first recognized later than two snapshots, older-child immigration/adoption and conflicting child birthdates go to delayed_or_older_recognition diagnostic, not incident newborn endpoint. Two parents of one child are two person-level transitions; descriptive ascertainment counts are numbers of residents with each flag, not distinct births; correlated parents share a family cluster only if linked at baseline, so nonbaseline co-parent dependence is a residual inference limitation reported separately from the additive bias calculation; widening a bias set does not repair covariance misspecification.

The aim is the probability of an OBSERVED newborn-associated legal parent state. It does not identify conception, intention, fecundity, stillbirth, completed fertility, biological first birth or all children abroad. Births conceived before rollout/announcement stay included; no pregnancy washout based on future births. The baseline nonparent rule cannot prove lifetime childlessness even with full delivered snapshots. No conditional ‘first birth’ relabeling is licensed at runtime.

Pseudocode: validate child identities and row cardinalities; invert both parent fields, drop only repeated identical child-parent-snapshot links; check birthdate invariance; build fixed observed-nonparent risk sets; enumerate each newborn child’s first two expected snapshots, find earliest link; produce event_lower=1 only for qualifying newborn linkage. If the index person exits or any necessary child population quarter

is individually unresolved, bound potential unobserved registration [0,1]; a missing whole population snapshot is `data_gap`. Fully complete delivered population tables and no qualifying record give zero for this recorded endpoint, but not zero for biological birth. Retain confirmed cumulative one after later exit. Fit the two fixed contrasts, all age/year/lead/bias checks and pre-baseline ascertainment ledger. Report counts of linked newborns, late links, older-child links, history-excluded residents and unknown exits (no invented zeros).

Outputs standard effect/cell/diagnostic/disposition; parenthood_
ascertainment.csv columns index_year, age, horizon, category, n (n counts residents with each flag) (baseline_candidates, history_observed, prior_link, history_unknown, eligible, newborn_link, late_link, older_child_link, unknown_exit). Figure3's parenthood row and TableS4 show results/coverage. Fewer events or short follow-up produce imprecision, not no lasting family effect. Code docs/execution/reference.py: `run_atom('atom-000005', ...)`.

Integrated outcome result partition, evaluated in the listed first-matching order: `data_gap` when no registered endpoint/horizon is constructable; `mixed_directions` when at least one B=2pp simultaneous interval is wholly positive AND another is wholly negative; `bounded_shift` when at least one such interval excludes zero and the previous mixed case does not apply; `sensitive_shift` when no B=2 interval excludes zero but at least one B=0 interval does; `inconclusive` when estimates/point bounds exist but none meets those regions, including `precision_unavailable`; otherwise for an evidenced unexpected scientific conflict. Each available endpoint has its own direction, gap/precision state and bias-breakdown output. Missing components do not erase independent results, and any partial coverage is mandatory in the main claim. None of these local states certifies causal identification, equivalence, wellbeing or a therapy mechanism. No finite bias allowance has been verified; report the unbounded-identification limitation alongside every conditional direction claim.

Shared binding definitions: docs/protocol/data-contract.md (fields, effective coding, population clocks, missingness and risk sets), docs/protocol/identification.md (exact cell contrast, inference, 20-comparison family and fixed bias scenarios), and docs/protocol/governance.md. These documents are incorporated in this protocol; implementation cannot choose alternative definitions. All fields come from the named allowed tables. No observed result exists.

Runtime inputs: certified normalized table DataFrames retaining original field names; metadata with source/period/dictionary provenance; read-only predecessor evidence; explicit writable output directory. Never assume supplied rows, cell counts or dictionary validity from a file name. Construction unit is a baseline person-by-index-year, then quarter history; outputs aggregate only. Resolve duplicates and assert cardinalities before any join. No post-exposure exclusions. Individual missing intervals remain unknown bounds; entire missing required periods are evidenced `data_gap`. Inaccessible or uncompleted operations give terminal `no_result` and `NO_registered_state`. The entry point logs graph or direct dispatch, but direct cannot bypass these requirements.

All effect products also include baseline.csv (index_year, age, field, category, n), with total cohort and sex, municipality, citizenship and recorded-immigration categories; unavailable context remains labeled. All effect products: effects.csv rows keyed by outcome, horizon with estimate, lower, upper (confirmed contrast and ordinary 95% interval), bound_lower, bound_upper (simultaneous missingness interval at B=0), bias1_lower, bias1_upper, bias2_lower, bias2_upper, raw_p, p_bonf, se, n, clusters_family, clusters_birthmonth, largest_cluster_share, status, reason, breakdown_bias, detectable_contrast. Estimates and limits are probability differences; plotting converts once to percentage points. Cells.csv keys index_year, age, outcome, horizon carry n, events, unknown, competing, p_lower, p_upper; no private IDs. diagnostics.csv keys outcome, horizon, check, value, lower, upper, status, reason contains historical age gaps, lead comparisons, age25-versus26 placebo, three leave-one-year contrasts, missing/competing totals and precision restrictions. Optional row-level trajectories and cluster assignments stay in governed intermediates, never export. disposition.json records local_state or terminal, scoped endpoint failures, upstream states, dispatch mode, dictionaries, code/software hashes and population/exclusion counts. A missing endpoint keeps its row with status and NaN numerical fields; never drops from family 20.

Synthetic verification: docs/execution/test_reference.py checks fixed clocks, exact birthdays/leap birthdays, duplicate joins, parent-versus-child moves, recognition losses without separation, loss/death/unknown distinctions, newborn versus older-child recognition, empty cohorts, hand-computable contrasts and bound endpoints, family dependence, missing predecessors, default nonactivation and direct dispatch. Code is a reference implementation under the protocol, not authority to repair scientific ambiguity. Figure renderers receive only these registered plot-ready summaries. No result CSV is shipped with this pre-data registration.

Scoped execution and reporting: Component prerequisites are evaluated separately. component_gaps.csv keys index_year, age, horizon, outcome, status, reason retain each established missing requirement; no affected endpoint row is dropped from effects.csv or the fixed family20. A missing return-history quarter does not block leave/sustained_away; a missing inferred-pair field/prior quarter does not block legal endpoints. Whole follow-up gaps still block every endpoint requiring that particular period. Individual unknown risk-set membership is separately tabulated, never selected using later outcomes. disposition.json records endpoint_statuses and predecessor states/terminals. A predecessor that has finished no_result closes its mandatory dependent route as not_activated; an unfinished predecessor stays pending. Direct dispatch bypasses only activation and must still establish the fixed policy, all primary baseline age cells and each endpoint's scientific inputs. Test definitions are in test_reference.py and test_observation_semantics.py. No synthetic data are shipped.

Death/link timing: birth date selects the newborn window; earliest qualifying recognition snapshot defines the observed legal-link evidence. Before confirming, require this snapshot strictly before any certified index-person death. A birth dated on/after death is flagged post_death_birth_link; a pre-death birth first recognized on/after death is flagged birth_before_death_recognition_after. Neither is an ordinary incident recorded-parenthood event, and neither is retroactively converted into

biological parenthood. Same-day order is unresolved and is excluded from the confirmed event under this strict recorded-before-death rule. Preserve earlier confirmed newborn links after later death. These excluded timing conflicts do not remove the person from the denominator; prior unresolved pre-death intervals still yield $[0,1]$. parenthood_ascertainment.csv extends its existing unique-resident categories with both conflict flags and death; Table S4c binds them. Two children carrying one flag count one resident, whereas diagnostic interval counts retain their stated unit. Invocation provenance: run_atom records a canonical SHA256 of supplied metadata plus separate hashes/presence for the input manifest, delivery certificates, historical family/civil/service dictionaries, certified dictionary periods, fee-week map and its source, billing periods, net-final adapter evidence, death periods, policy chronology and caller construction-accounting manifest. It records Python/package versions, source-code SHA256, input table field/dtype inventories and aggregate row counts, then hashes every emitted aggregate product and indexes construction-accounting outputs. This applies to graph/direct dispatch, scoped boundaries, pending/nonactivated routes and no_result. The caller retains source manifests and input-file checksums in governed storage; missing caller provenance is explicitly listed, never invented. No private row or credential is exported. docs/execution/README.md specifies the caller interface and test_provenance_and_pairs.py verifies metadata-only changes.

Optional death evidence: DODSAASG2022 is an extract vintage for the documented 2002–2022 event register. A supplied DODSAASG DataFrame, including a certified empty extract, requires death_periods entries start/end/source. Validate every actual PNR/D_DODSDATO against the certified event periods within 2002–2022, with unique consistent dates. Uncompleted certification or out-of-certificate rows require no_result and a governed adapter; do not infer survival from absent optional evidence, extrapolate beyond the certified periods or add another register. Absence of DODSAASG leaves BEF observation rules unchanged and exits unresolved.

Editorial timing specification, 9 September 2026 UTC / 8 September 2026 America/Chicago: the quarterly comparisons already incorporated from docs/protocol/identification.md are displayed over their registered clock. Figure4 (reader Figure3) binds diagnostics.csv, check=trajectory_lead for horizon in $\{-9,-6,-3,0\}$ and check=trajectory_curve for horizon in $\{3,6,9,12,15,18,21,24\}$, separately for every outcome of this Atom. Fields value,lower,upper,status,reason retain their existing meanings: confirmed-record age-by-era contrasts and ordinary pointwise conditional 95% intervals. These are descriptive timing diagnostics, not additional confirmatory tests, simultaneous path bands, observation-bound intervals, or bias-widened causal trajectories. Reuse the same baseline risk sets, event constructors, era weights and uncertainty rules; do not recenter at rollout, fit a new event-study regression, smooth, interpolate missing quarters, or infer a hazard. The sustained_away and same_partner outcomes describe horizon-specific states and need not be monotone; the other registered cumulative-event probabilities do not make their age-by-era differences monotone. Persistence rules and recognition windows themselves affect visible timing. No difference between time points or domains is tested here, and a pointwise interval first excluding zero does not establish causal onset. Directional main claims still use the registered 20-comparison family at h12/h24 and its observation/bias sets.

Retain every quarterly position, displaying missing positions with their scoped reason; a renderer may show an absent row as unavailable but must not invent its scientific disposition. Existing age25_26_placebo, reference-year and leave-one-year diagnostics remain fully reportable in Tables S3a/S3b and the bound aggregate outputs. No activation, local result region, hypothesis, population or output column is changed by this display binding.

Remaining registration fields

The `preregistration.protocol` field is reproduced in full immediately above; all remaining fields are reproduced below.

```
id: atom-000005
topic: Recorded parenthood
atom_result: prereg
atom_strength: null
atom_shape: null
evidence_paths: []
concepts: []
literature: []
bonds: []
preregistration:
  version: 1
  mode: adaptive
  question: Does the age-targeted access regime change newborn-linked recorded
    parenthood?
  rationale: 'Question and role: Does the regime shift transition into
    ↪ newborn-linked
    recorded parenthood among baseline residents without an observed child
    link in the fixed history? This distinct long-commitment question is not
    reducible to partnership or residential prevalence. It covers the
    ↪ requested
    family-formation domain while explicitly leaving true first
    ↪ biological/lifetime
    parenthood unsupported.'
```

assumption: Registered exposure, observation and counterfactual assumptions are explicit in this protocol and the shared data/identification contract; none has been empirically established.

```
target_strength: causal
target_shape: comparison
ratings:
  importance: 5
  novelty: 4
  feasibility: 2
  data_advantage: 4
  informativeness: 0.6
tables:
- BEF
- DODSAASG
activation: done(atom-000001) AND ((state(atom-000001) == "uptake_increase"
  OR state(atom-000001) == "uptake_decrease" OR state(atom-000001) ==
    ↪ "uptake_uncertain"
  OR state(atom-000001) == "code_gap") AND done(atom-000002))
verdicts:
- key: data_gap
  region: No endpoint/horizon constructable.
  says: This trajectory question is unresolved under the supplied data.
```

- key: mixed_directions
region: At least one positive and at least one negative B=2pp simultaneous interval.
says: Registered margins shift in different directions conditional on the bias limit; no common welfare sign.
- key: bounded_shift
region: No mixed region, at least one B=2pp interval excludes zero.
says: At least one registered trajectory shift survives the stated $\hookrightarrow$ hypothetical bias allowance.
- key: sensitive_shift
region: No B=2pp interval excludes zero, but a B=0 interval does.
says: Directional evidence depends on stronger age-gap stability than the fixed 2pp scenario.
- key: inconclusive
region: Estimates/point bounds exist; no earlier direction region, $\hookrightarrow$ including unavailable precision.
says: Uncertainty does not resolve a directional policy contrast; no $\hookrightarrow$ equivalence claim.
- key: otherwise
region: otherwise
says: Unresolved scientific conflict; no additional claim or unregistered branch.

Registered question

Does the age-targeted access regime change newborn-linked recorded parenthood?
Prospective registration. All empirical results and local states are pending.

atom-000006: Joint transition patterns

Question and role: characterize co-occurrence and observed sequence across domains among fixed baseline people. This is one coherent descriptive experiment with three scientifically specified modules; neither a new effect estimator nor a collection of post-treatment subgroup effects. It is registered irrespective of uptake, outcome directions or measurement-audit conclusions.

Binding sources: docs/protocol/data-contract.md, identification.md (clocks only; NOT its policy estimator/inference), governance.md, and the measurement definitions in atom-000003, atom-000004 and atom-000005. Those definitions are reused as scientific specifications without requiring those Atoms' empirical outputs or result states. No dependency on SSSY or a demonstrated first stage exists. DODSAASG is optional and requires its exact certified-period protocol. All empirical results remain pending.

Population and timing: c in $\{2017, 2018, 2019, 2021\}$; age 24 or 25 on $R_c = \text{July1}(c)$; baseline $B_c = \text{June30}(c-1)$, irrespective of subsequent residence or survival; $H_c, 12 = \text{June30}(c+1)$, $H_c, 24 = \text{June30}(c+2)$. Use each person's original baseline membership, never eventual therapy, marriage, children or moves. A person can appear in multiple index cohorts/modules; the descriptive cells are not independent samples and must not be added across modules/cohorts. No age26 joint module is registered.

Three modules and fixed intersection risk sets: (1) `home_union`: known baseline co-resident with a frozen parent AND recognized unpartnered at B and the preceding quarter, using the full atom-000004 recognition dictionary. A=qualifying leave; B=`union_entry`. The move and recognized entry may be first observed in the same quarterly interval without establishing same-day actions. (2) `return_separation`: known residence apart from frozen parents at ALL four baseline-away snapshots AND stable original recognized/co-resident pair at B and the preceding quarter. A=strict return to a parent's previously occupied address; B=verified separation from that original partner. Both counts use the original paired-away denominator, including people with neither event. Partner death alone is not separation, and a later partner's separation is not the registered event. (3) `union_parenthood`: recognized unpartnered at B and the preceding quarter AND recorded nonparent under atom-000005's five preceding December snapshots plus four baseline quarters with all necessary child-parent inversions. A=`union_entry`; B=newborn-linked recorded parenthood. Retain the newborn confirmation window and original person's observation/death conditions exactly. This is not true lifetime first parenthood, pregnancy, intentions or conception. Same-sex/inferred-union coverage limits remain; no inferred absent partner outside validated dictionary coverage.

Required fields: BEF_PNR, FOED_DAG, REPERENCETID, ADRESSE_ID, BOP_VFRA, MOR_ID, FAR_ID, E_FAELE_ID, AEGTE_ID, CIVST, CIV_VFRA, FAMILIE_TYPE, FAMILIE_ID, PLADS as needed by each module's inherited endpoint/risk-set definitions. Full resident-person snapshots are required to establish linked parents, candidate partners and newborn links; an index-person-only extract is insufficient. Use only current allowed BEF plus optionally certified DOD-SAASG. No diagnoses, therapy modality, pregnancy, household satisfaction or referral dates are invented. Missing parenthood history affects `union_parenthood` alone; missing legal-only outcome inputs not required for a module do not block it. A missing dictionary must be scoped to the events/risk sets that require it.

Baseline accounting: enumerate age/cohort baseline residents, establish each conjunct using only information at/before B, then form the intersection. Count known excluded and `baseline_unknown` separately. Include an intersection member only if both conjuncts are known true. Do not recover unknown baseline membership from future child/partner/residence records. Unknown membership is outside the established-denominator bounds and limits their target population; no population-wide extrapolation is allowed. For each module/c/a/h emit n, `baseline_candidates`, `baseline_unknown` and reason. Never choose a larger risk set after finding few events.

Construction pseudocode: validate delivered periods, dated dictionaries, duplicate resolution and many-to-one joins; freeze baseline person/parent/original-partner identities; for each module,c,age,h and each known baseline intersection member: reconstruct A and B independently with the exact inherited cumulative event algorithms; retain event indicators [L_A,U_A], [L_B,U_B] and first-detection intervals; death/exit/missingness follows the endpoint-specific competing/unknown rules; if both upper indicators are zero: pattern=neither; elif L_A=1 and U_B=0: pattern=a_only; elif L_B=1 and U_A=0: pattern=b_only; elif L_A=L_B=1: certify an onset interval only when all earlier eligible observation intervals exclude that

event; for A and B with certified half-open intervals (left,right], $\text{right_A} \leq \text{left_B} \Rightarrow \text{a_before_b}$; $\text{right_B} \leq \text{left_A} \Rightarrow \text{b_before_a}$; identical adjacent-quarter endpoints $\Rightarrow$ `same_observation_interval`; otherwise $\Rightarrow$ `both_order_unresolved`; any earlier unresolved event opportunity $\Rightarrow$ `both_order_unresolved`; else: `pattern=event_membership_unresolved`. aggregate all eight patterns, retaining explicitly zero counts only in processed cells; compute marginal lower/upper means and joint $\text{lower} = \text{mean}(L_AL_B)$, $\text{upper} = \text{mean}(U_AU_B)$.

Order refers to first observed qualifying event recognition from B, not life-course first-ever events. In `union_parenthood` use the first qualifying parent-link RECOGNITION snapshot as the right endpoint, and its preceding quarter as the left endpoint. Newborn birth date establishes eligibility for the endpoint but must not be substituted for recognition timing in this comparison. Child-link confirmation may require post-H snapshots per atom-000005. Earlier unobserved possible recognition or missing adjacent snapshot makes order unresolved. Identical observed intervals do not establish simultaneity. For residence/union, unobserved changes and reunions between quarter ends are not reconstructed. Confirmed cumulative event indicators survive later death/exit; uncertain earlier intervals are never overwritten by later known absence. Whole required-period gaps yield a scoped cell data `_gap`, not an event count.

Estimands: finite-cohort person fractions in the fixed known intersection populations, separately by year/age/horizon. Eight exhaustive mutually exclusive observation-pattern shares sum to one for each available $n > 0$ cell. Joint occurrence lies in the registered observation interval. These are descriptive identification bounds with no sampling confidence interval, p-value, treatment contrast, hazard, mediation coefficient, between-cell equality test, bias-calibrated causal claim or family20 addition. No causal interpretation is allowed even if pattern shares vary across ages/eras alongside a policy contrast. The logical conservative upper product may overstate feasible joint occurrence; it is deliberately not tightened using unregistered cross-event assumptions.

Output `joint_patterns.csv`: keys `module,index_year,age,horizon,pattern`, where `pattern` is in the fixed order `{neither,a_only,b_only,a_before_b,same_observation_interval,b_before_a,both_order_unresolved,event_membership_unresolved}`; columns `n,count,share,baseline_candidates,baseline_unknown,status,reason`. Emit all 384 rows (34228); missing cell counts/shares are NA, not zero. Empty known denominator uses `empty_risk_set` and NA shares. Output `joint_bounds.csv`: keys `module,index_year,age,horizon`; columns `n,a_lower,a_upper,b_lower,b_upper,both_lower,both_upper,unknown,baseline_candidates,baseline_unknown,status,reason`, where `unknown` counts people with any event-membership uncertainty. Both-order uncertainty remains in its own pattern and is not this unknown count. All 48 rows are mandatory. Output `component_gaps.csv` uses `module,index_year,age,horizon,status,reason`. Output `disposition.json` records `registered_state` or `terminal` (never both), scoped coverage, dispatch, aggregate construction-accounting, certified dictionaries/periods, input/code/software hashes and failures. No person IDs or row-level trajectories are exported.

Runtime interface: `run_atom('atom-000006', tables, metadata, states=..., terminals=..., dispatch='graph', output=output_dir)` under the explicit common execution

adapter. Graph dispatch sees TRUE; direct dispatch bypasses no data or scientific prerequisite. Implementation may share event constructors with atoms3-5 but cannot require their activated empirical result files. Unsupported inputs give a documented scientific data_gap only after absence is established; uncompleted/inaccessible operations give terminal no_result and no local scientific state. Outcome-dependent additions, redefining the intersection, merging sparse modules or changing timing to obtain a clearer order are forbidden. Reference implementation and synthetic tests are determined in docs/execution/interfaces.md for Transcriber.

Mandatory tests: no-event, A-only, B-only, both orders, same quarter, earlier unknown then both confirmed, membership-unknown baseline, wholly absent child history with other modules supported, zero denominator, spouse widowhood versus original-pair separation, newborn eligibility versus recognition timing, out-of-period death evidence, return caused only by a parent's move, leave-return-leave, death/exit after confirmed event. Check partition sum=n, bounds in [0,1], joint lower<=each marginal lower, joint upper<=each marginal upper, exact 384/48 output keys and no confidential IDs. These tests use temporary synthetic inputs outside the World and never provide a runtime fallback or substantive result.

Interpretation clarification, 9 September 2026 UTC: same-person joint event occurrence is not same-person joint treatment response. Neither observed A and B nor their order identifies whether both individual potential-outcome treatment effects are nonzero, their covariance, or the overlap of people whose events were caused by the policy. This is a clarification of the existing descriptive restriction, with no change to estimands, event definitions, states or activation.

Remaining registration fields

The preregistration.protocol field is reproduced in full immediately above; all remaining fields are reproduced below.

```
id: atom-000006
topic: Joint transition patterns
atom_result: prereg
atom_strength: null
atom_shape: null
evidence_paths: []
concepts: []
literature: []
bonds: []
preregistration:
  version: 1
  mode: adaptive
  question: Which residential, partnership and recorded-parenthood transitions
    concern the same baseline people, and which observed sequences can
    ↪ quarterly
    records distinguish?
  rationale: Marginal policy contrasts cannot establish whether transitions
    concern the same people. Three pre-specified intersection populations
    describe co-occurrence and observable order, retaining people with neither
    event and uncertain observation. This answers an independent descriptive
    question without mediation, selected transition hazards or a causal
    ↪ fallback.
```

```

assumption: Only documented person/address/parent/partner fields and
↳ certified
  histories are used. Baseline intersection membership must be established
  before follow-up. Quarterly first-recognition intervals need not equal
  underlying life-event dates. Neither cross-era nor cross-age descriptive
  differences identify a policy effect.
target_strength: descriptive
target_shape: comparison
ratings:
  importance: 4
  novelty: 3
  feasibility: 3
  data_advantage: 4
  informativeness: 0.6
tables:
- BEF
- DODSAASG
activation: 'TRUE'
verdicts:
- key: data_gap
  region: No module-by-cohort-by-age-by-horizon cell has an established
  positive baseline denominator and any informative event observation.
  says: Joint transition patterns cannot be characterized from the supplied
  histories; this is not absence of co-occurrence.
- key: cooccurrence_observed
  region: At least one supported cell has one or more people with both
  ↳ events
  confirmed.
  says: At least one fixed-baseline population contains confirmed joint
  transitions. Report the exact module, cohort, horizon, denominator and
  ordering uncertainty; no policy mechanism follows.
- key: no_cooccurrence_observed
  region: All 48 planned cells are available with positive established
  ↳ denominators,
  zero unresolved baseline membership, complete event ascertainment and
  both_upper=0 in every cell.
  says: No registered co-occurrence is observed in these complete, fixed
  populations and windows. This is not equivalence, a policy null or
  ↳ absence
  of within-quarter transitions.
- key: unresolved_overlap
  region: At least one cell is informative, no confirmed joint event exists,
  and the complete zero-co-occurrence condition is not met.
  says: Incomplete observation or scope prevents resolving co-occurrence.
  Preserve supported marginal and pattern descriptions without
  ↳ interpreting
  missing cells as zeros.
- key: otherwise
  region: otherwise
  says: An unexpected scientific inconsistency remains unresolved; no new
  comparison is selected.

```

Registered question

Which residential, partnership and recorded-parenthood transitions concern the same baseline people, and which observed sequences can quarterly records distinguish?

All empirical results and local states are pending.