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# Using Ontologies to Enhance Data on Intimate Partner Violence

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# Intimate Partner Violence

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- Intimate Partner Violence (IPV):
  - Violence or abuse between people who are or have previously been intimate partners.
  - Intimate partner: Spouse, dating partner, boyfriend/girlfriend, or ongoing sexual partner.
  - Takes different forms, including psychological, physical, and sexual abuse.

# Intimate Partner Violence (IPV)

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- Among the negative health outcomes of IPV are:
  - Injuries, stress-related disorders, depression, anxiety, suicidal thoughts/attempts, unwanted pregnancy, unsafe abortion, and STDs
- Such outcomes are why IPV is among the Social Determinants of Health (SDoH).

# Social Determinants of Health (SDoH)

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- According to WHO: SDoH “are the non-medical factors that influence health outcomes,” and “the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life.”
- Two instruments to gather SDoH–related data, each of which asks IPV-related questions:
  - PRAPARE: Protocol for Responding to and Assessing Patients’ Assets, Risks, and Experiences
  - Epic Healthy Planet: the SDoH-focused module of Epic’s EHR software system

# Safety and Domestic Violence in PRAPARE

- PRAPARE categorizes 2 questions under “Safety and Domestic Violence”:

**(Q1)** Do you feel physically and emotionally safe where you currently live?

<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Unsure
<input type="checkbox"/>	I choose not to answer this question				

**(Q2)** In the past year, have you been afraid of your partner or ex-partner?

<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Unsure
<input type="checkbox"/>	I have not had a partner in the past year				
<input type="checkbox"/>	I choose not to answer this question				

# IPV in Epic Healthy Planet

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- Epic categorizes 4 questions as IPV-related.
- One is equivalent to one of PRAPARE's, but with different possible outcomes:

**(Q3)** Within the last year, have you been afraid of your partner or ex-partner?

Yes  No  Patient Refused

# IPV in Epic Healthy Planet

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- The other 3:

**(Q4)** Within the last year, have you been humiliated or emotionally abused in other ways by your partner or ex-partner?

**(Q5)** Within the last year, have you been kicked, hit, slapped, or otherwise physically hurt by your partner or ex-partner?

**(Q6)** Within the last year, have you been raped or forced to have any kind of sexual activity by your partner or ex-partner?

- Possible outcomes for each:

Yes

No

Patient Refused

# Salient entities mentioned in questions/responses

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- 5 questions mention a temporal interval denoted by either “the past year” or “the last year.”
- We connect the respondent to that interval via the respondent’s BFO: *history*, some proper part of which exactly occupies the denoted interval.
  - BFO: *history* of a continuant is the sum of all processes in which that continuant is a participant.



# Salient entities mentioned in questions/responses

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- For (Q1), the referents of a “Yes” or “No” include the referent of “where you currently live.”
- OMRSE: *disclosure of residence* is a process that outputs a respondent’s residential data.
  - Those data include OMRSE: *residence ZIP code information content entity*, which is about some GEO: *geographical region*.

# Salient entities mentioned in questions/responses

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- 3 questions ask about a feeling or judgment of safety.
- We use the Emotion Ontology's *appraisal of dangerousness* and its subclasses.

**(Q1)** Do you feel physically and emotionally safe where you currently live?

- If “Yes”: appraisal as not dangerous (about where you live)
- If “No”: appraisal as dangerous (about where you live)

**(Q2)/(Q3)** In the past year, have you been afraid of your partner or ex-partner?

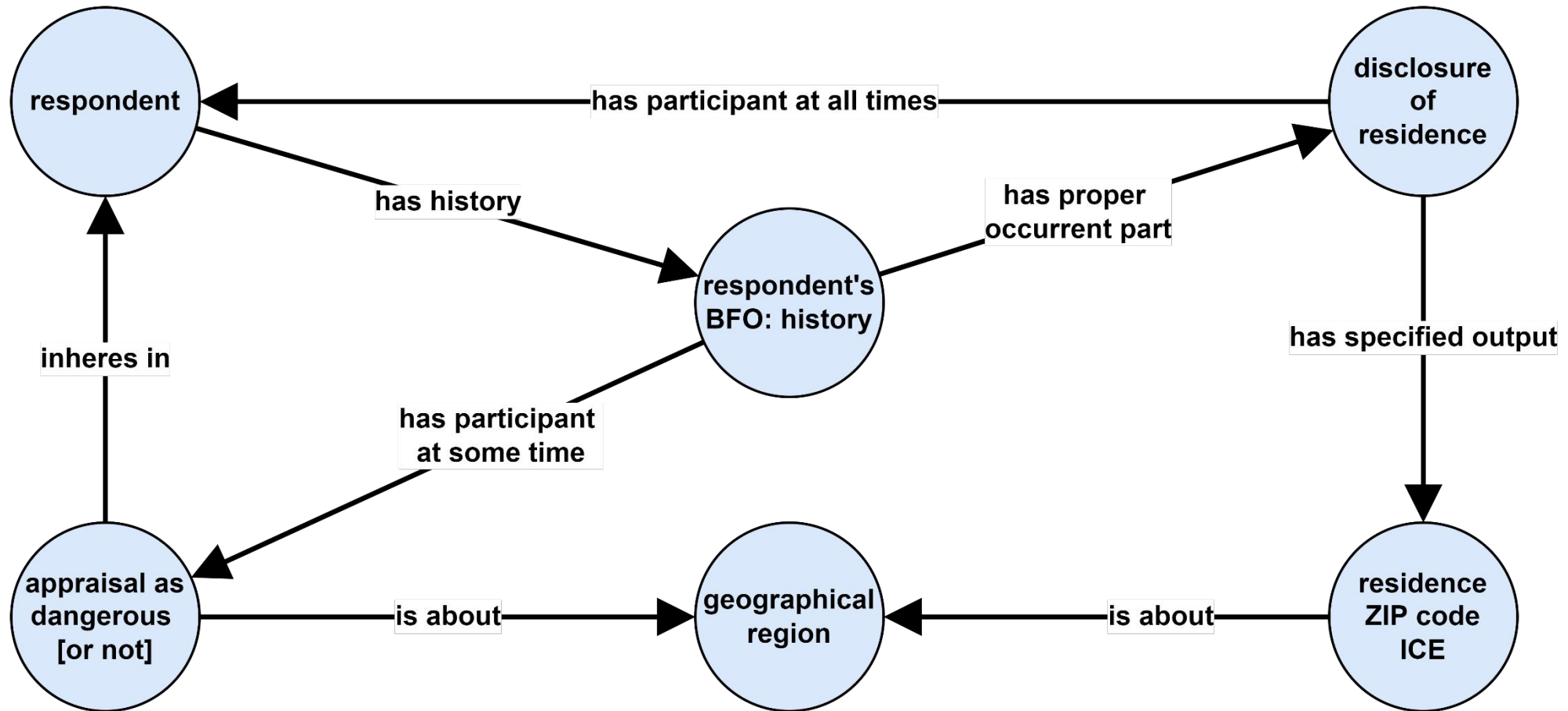
- If “Yes”: appraisal as dangerous (about partner or ex-partner)

## **Note on *is about* and *appraisal of dangerousness***

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- The ‘is about’ here differs somewhat from that of IAO.
- The domain of the one used here includes representations (not just ICEs).
  - This is consistent with Ceusters, W. & Smith, B. (2015): “Aboutness: Towards Foundations for the Information Artifact Ontology.”
- *appraisal of dangerousness* (MFOEM) is a subclass of *representation* (MF).

# (Q1) Do you feel physically and emotionally safe where you currently live?



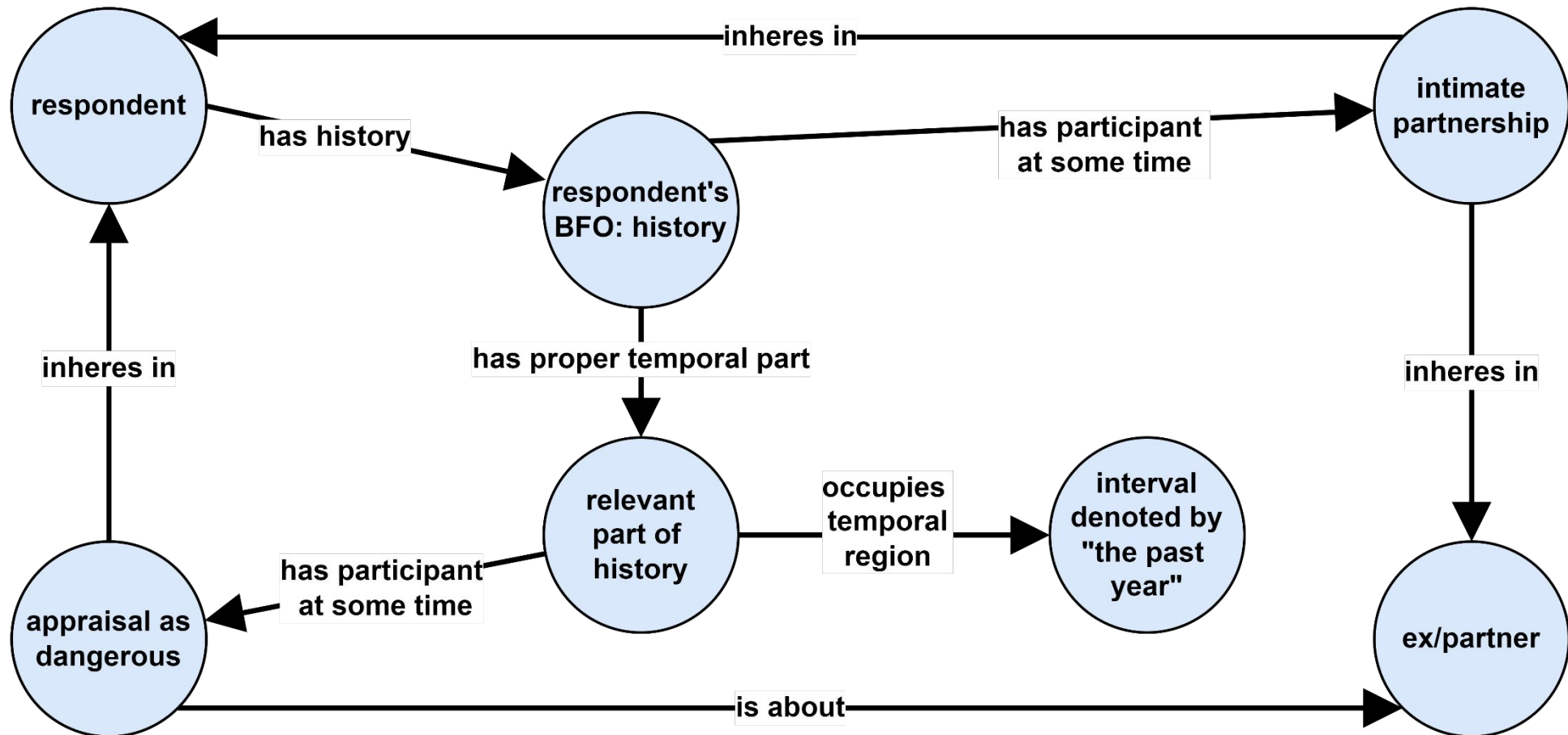
*Referents of 'Yes' or 'No' to (Q1)*

# Salient entities mentioned in questions/responses

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- For 5 questions, “Yes” implies there is/was an intimate partnership.
- Using BFO: *relational quality* and a CDC description of intimate partnerships, we introduce:
  - **intimate partnership** =<sub>def.</sub> Relational quality inhering in persons by virtue of being each other’s spouse, boyfriend/girlfriend, dating partner, or ongoing sexual partner.

# (Q2)/(Q3) In the past year, have you been afraid of your partner or ex-partner?



*Referents of 'Yes' to (Q2)/(Q3)*

# Representing abuse and some subtypes

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- Each of the 3 remaining questions ask about a different sort of abuse.
- Drawing upon the *APA Dictionary of Psychology*'s definition of "abuse," and using GO: *behavior* as the parent class, we introduce the following:
  - **abusive behavior** =<sub>def.</sub> Behavior that is cruel, violent, demeaning, or invasive.

# Representing abuse and some subtypes

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- We introduce distinct object properties to connect the abuse to each of the aggressor and the abused:
  - **has aggressor** =<sub>def.</sub>  
Relation between an abusive behavior and one who inflicts it upon someone or something else.
  - **is abuse of** =<sub>def.</sub>  
Relation between an abusive behavior and one upon whom it is inflicted.



# Representing abuse and some subtypes

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- We draw upon CDC definitions for subclasses of *abusive behavior*:
- **psychologically abusive behavior** =<sub>def</sub> Abusive behavior in which the aggressor does or attempts to do the following: mentally or emotionally harm or exert control over another.
- We say more about the phrase “does or attempts to do” in 2 slides.

# Representing abuse and some subtypes

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- **physically abusive behavior** =<sub>def</sub>

Abusive behavior in which the aggressor does or attempts to do the following: harm, restrain, or coerce another through physical force.

- **sexually abusive behavior** =<sub>def</sub>

Abusive behavior in which the aggressor does or attempts to do the following: force or coerce another to participate in a sexual act to which the latter has not freely given consent.

# Representing abuse and some subtypes

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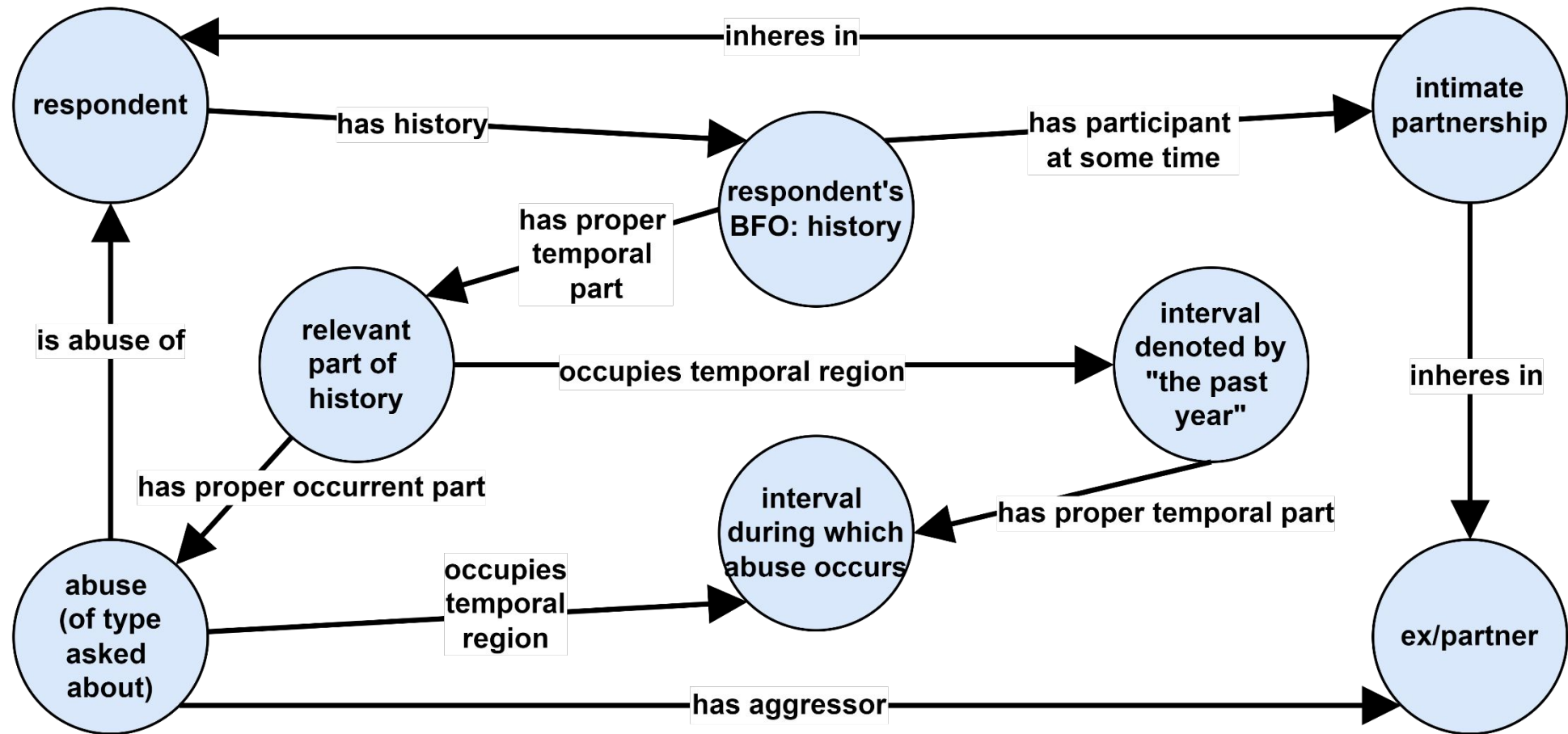
- We say “does or attempts to do” for a combination of reasons:
  - We include “attempts to do” because both successful and failed attempts count as abuse:
    - Example of failed attempt: A dodged punch.
  - But attempts alone do not cover it: causing the same results can be abusive even when not intended or attempted.
    - Example: Pattern of causing injuries through carelessness.

# Salient entities mentioned in questions/responses

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- We can now represent the situation implied by a ‘Yes’ in the same way for these 3, except that the type of abuse is different for each.
- In each case, a “Yes” implies:
  - Some type of abusive behavior occurred.
  - The abusive behavior *is abuse of* the respondent.
  - The abusive behavior *has aggressor* a partner or ex-partner of the respondent.

(Q4)/(Q5)/(Q6) Within the last year, have you been [psychologically / physically / sexually abused] by your partner or ex-partner?



*Referents of 'Yes' to Q4, Q5, or Q6*

# Using Ontologies to Enhance Data on IPV

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- Each diagram above shows only the referents of a single response.
- As representations of responses to additional prompts are developed, data from those too may be transformed in the same manner, yielding a larger representation of health-relevant factors in the respondent's life.
- That representation becomes even larger in cases where it includes the referents of EHR data about the same person.



**Thank you**

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