

# **Systematisch Review: Geluid Interventies en Gezondheid**

**- een korte samenvatting**

Lex Brown & Irene van Kamp

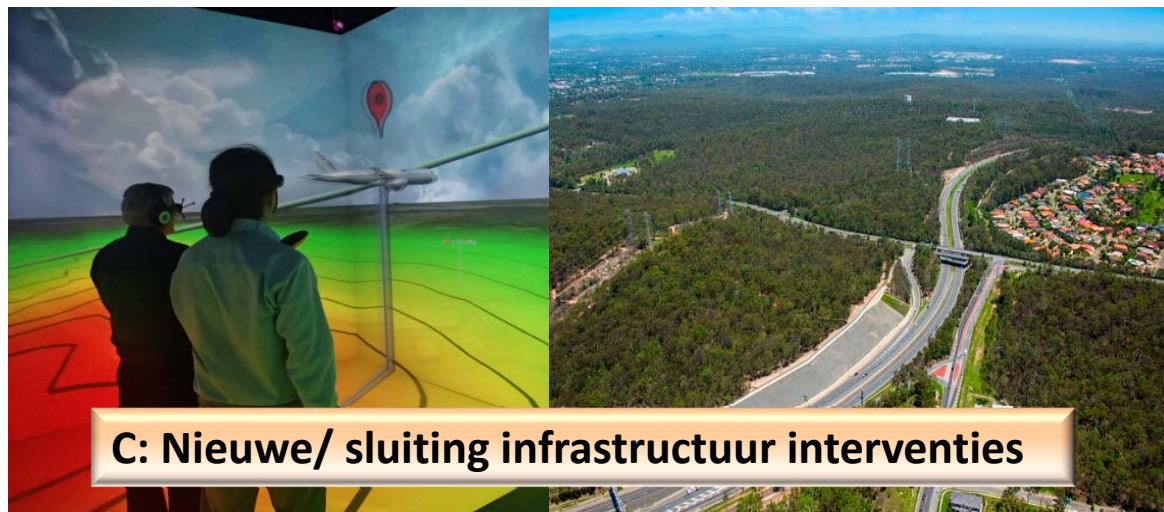


## Environmental noise interventions and health.

*...review the literature for evidence of environmental noise interventions leading to a change in human health outcomes...*

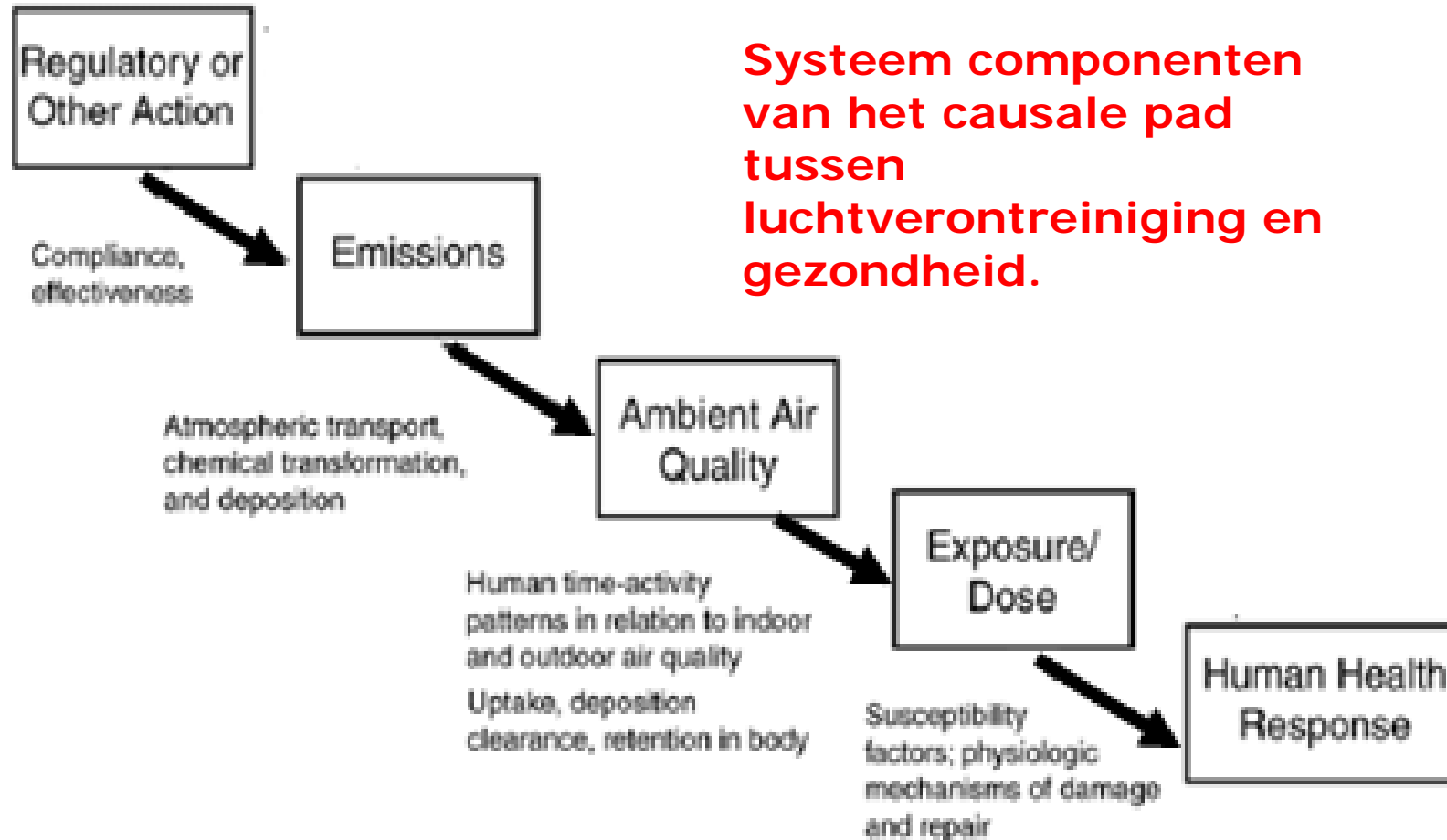
## GEZONDHEIDSUITKOMSTEN:

- HINDER
- SLAAPVERSTORING
- HART-VAAT EFFECTEN
- COGNITIEVE ONTWIKKELING IN KINDEREN



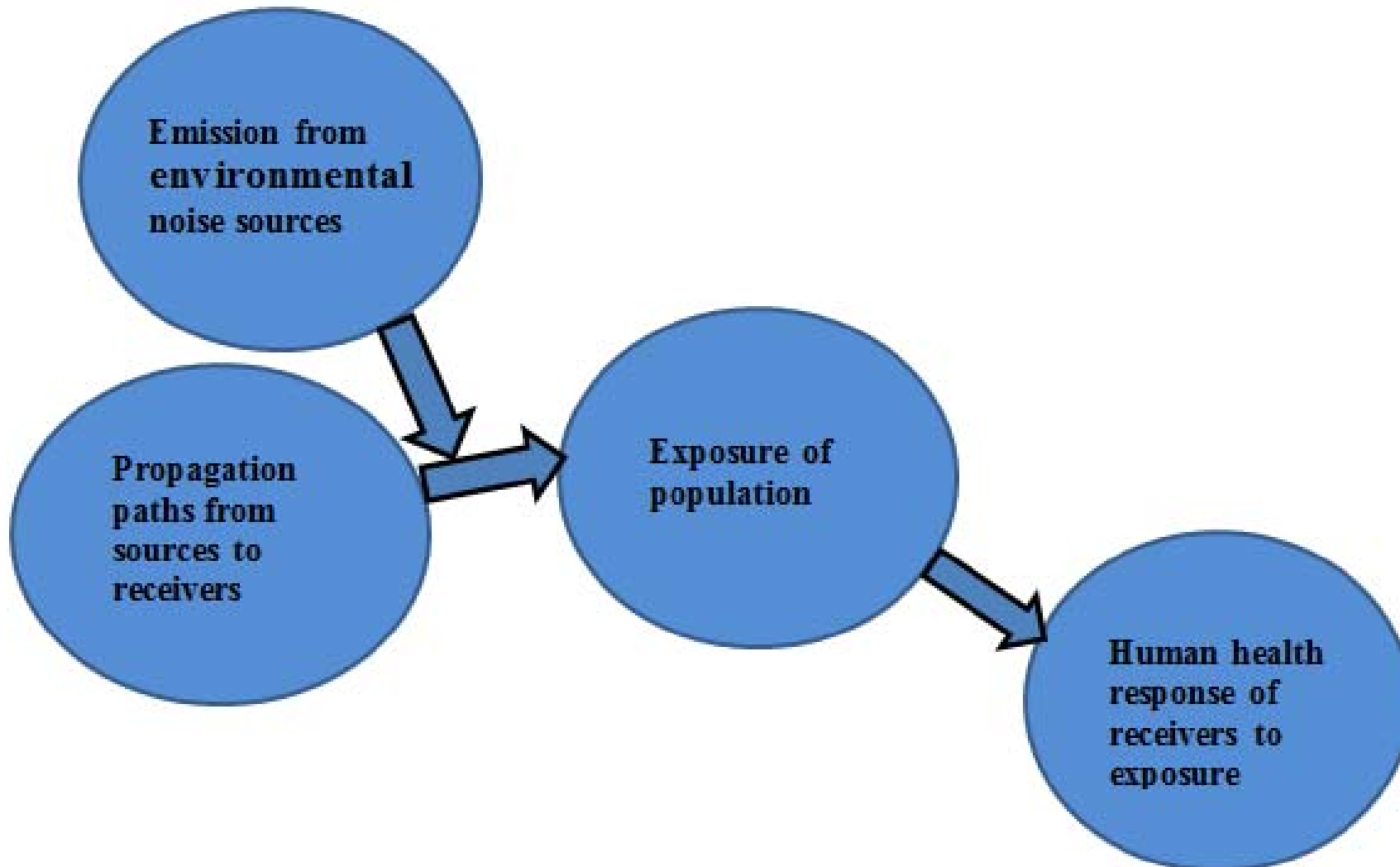
**D: Andere fysieke interventies**  
**E: Communicatie interventies**

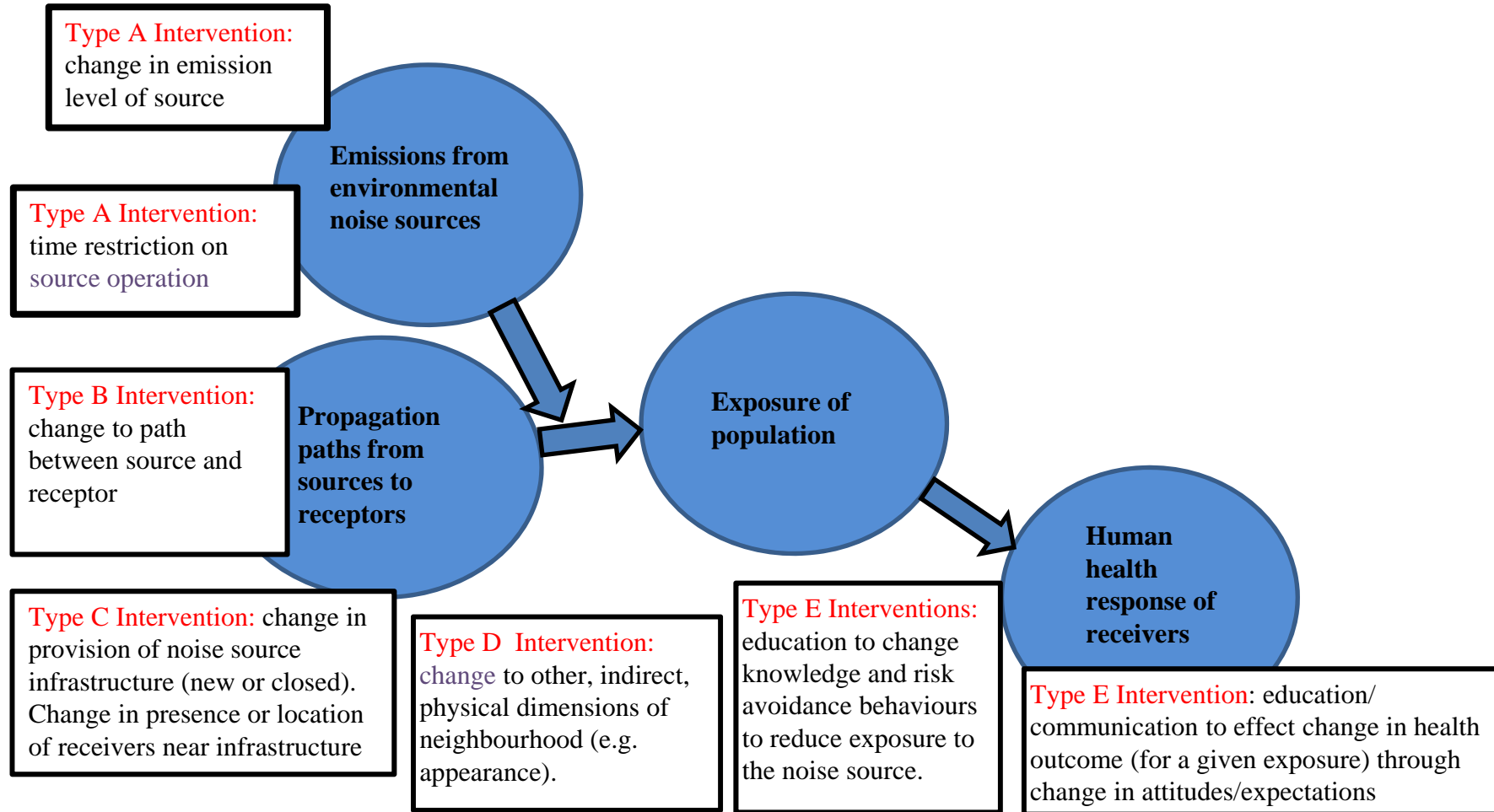
## Air pollution “accountability research” model after: HEI (2003) & Burns et al. (2014)

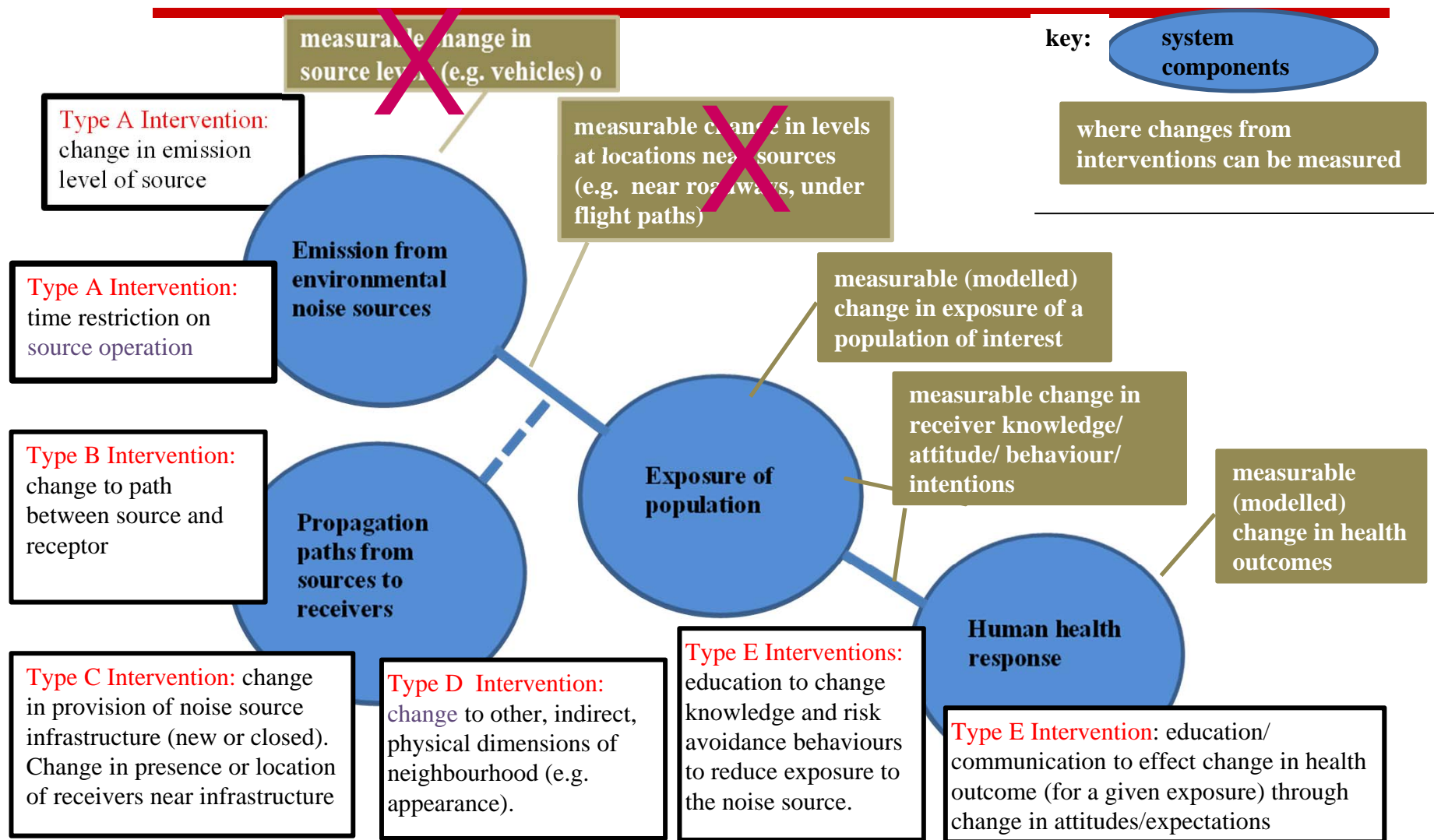


## Systeem componenten van het oorzakelijke pad tussen geluid en gezondheid.

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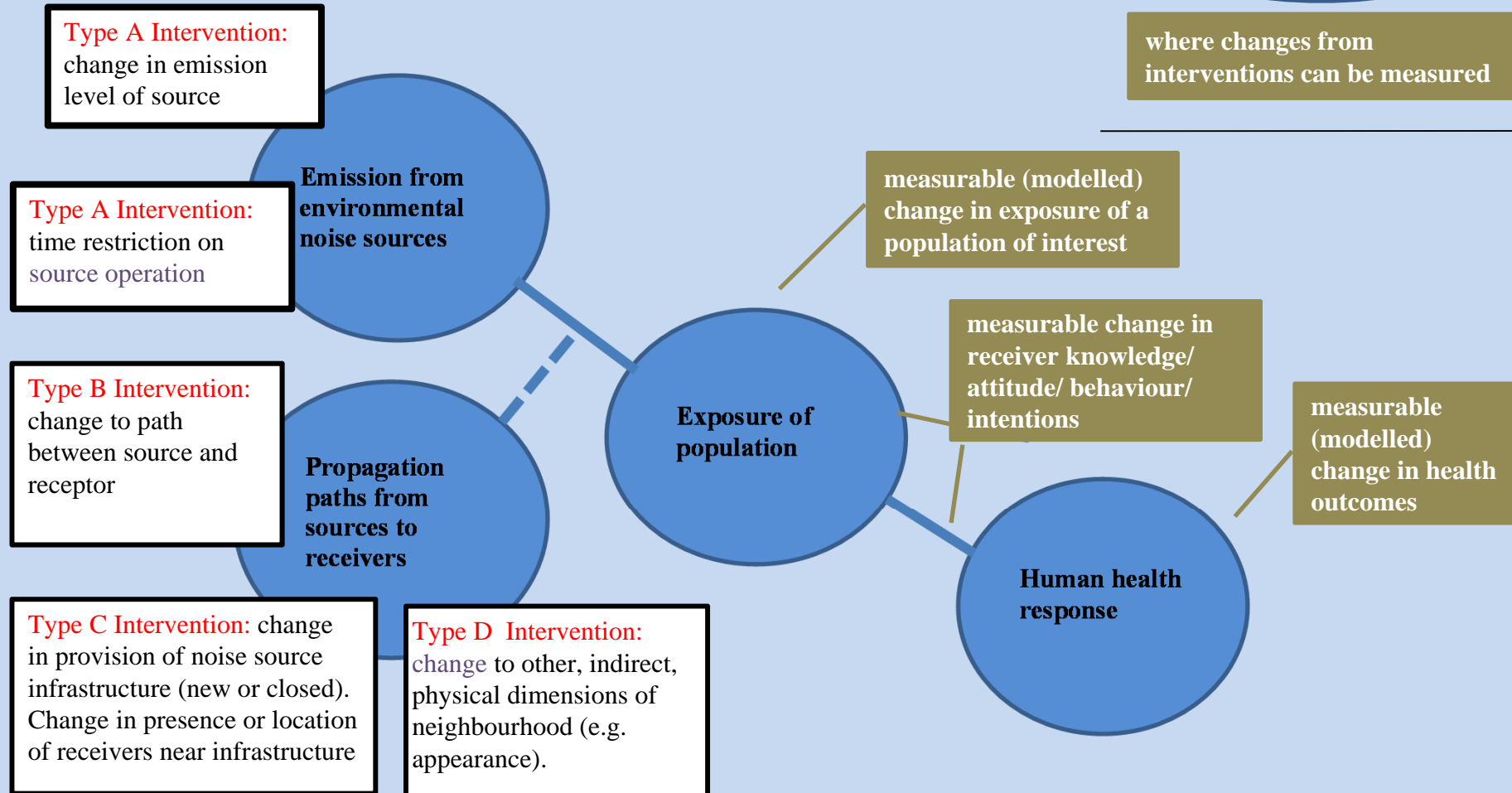


# Eindmodel

key:

system components

where changes from interventions can be measured



Environmental noise interventions and health.

*...review the literature for evidence of environmental noise interventions leading to a change in human health outcomes...*

- |  | # STUDIES |
|--|-----------|
| • Literatuur search 1980-2014:                             | 545       |
| • Volledige tekst :  | 116       |
| • 52 interventie studies voldeden aan de inclusie criteria |           |
| – 43 hadden betrekking op transport                        |           |

Deze 43 interventie studies gegroepeerd voor analyse:

Bron x Interventie typex uitkomst

Hiervoor waren 15 verschillende groepen nodig.

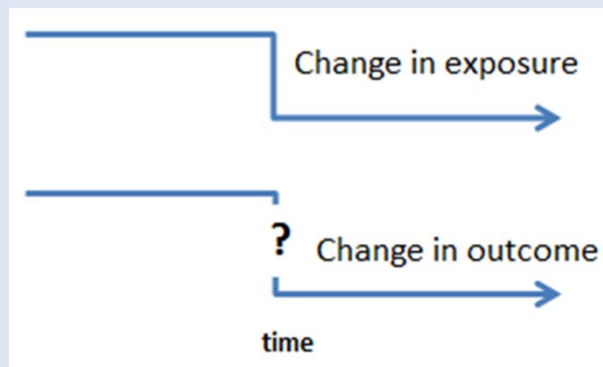


Meeste individuele studies hebben **hoog risico op bias** (vertekening);  
**Bewijs voor effect dun verspreid** over de 15 groepen (bron x type x uitkomst);

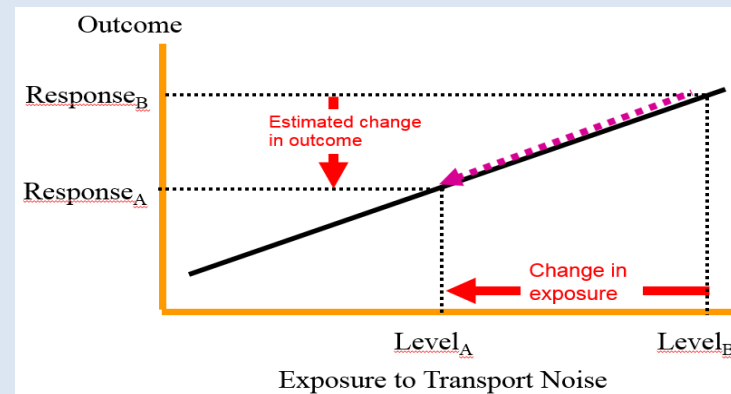
**Heterogeniteit** in studie aanpak, analyse, blootstelling en  
verandering in blootstelling, zelfs binnen groepen >>> geen meta-analyse mogelijk;

Synthese van data aan hand van narratieve analyse ahv zogenaamde **harvest plot: twee hypothesen:**

I Is er een verandering in uitkomst na interventie?



II Was de omvang van verandering op zijn minst in lijn met een relevante DR relatie ?



# Voorbeeld van data extractie

| Authors                       | Intervention & Study                                |  | N, Response Rate & Method   | Exposure Levels  |  | Change in levels and distribution of change across Participants  | Outcome measure(s) Before and after outcomes   | I. Did outcome change with change in exposure? Yes/No  | II. Before/after outcome change compared to that estimated from an ERF  | Comments  |
|-------------------------------|---|--|---|--|--|--|--|--|---|---|
|                               | Nature  | Design   |   | Before   | After  |  |  |  |   |   |
| Nilsson & Berglund (2006)     | Sweden<br>Noise barrier                             | B/A study + control<br>9mos. B; 15mos. A<br>Repeated measures on 59%, 46% only | Before 304<br>Response rate 77%<br>(241 control<br>Response rate 66%)<br>(After Response rates: 72%, 69%)<br>Self-administd | L <sub>den</sub> 70<br>- <45<br>Calculated   | L <sub>den</sub><br>62.5 - <45<br>Calculated         | -7.5 dB; with reducing change out to 100m from barrier. Distribtn of change was:<br>-7.5 dB 52Ps<br>- 5 dB 47Ps<br>-2.5 dB 31 Ps | Visual analogue scale<br>7-point annoyance scale.<br>Transformed to 0-100 scale.<br>Reports %HA as above cut-off 72. | Yes<br><br>Reductions in %HA were significant (p<.05, sign-test) for three groups of Ps within 100m of roadway.<br><br>Control: no diff in B&A %HA | ERF cited was Miedema & Oudshoorn (2001) <sup>13</sup><br><br>Reports both B&A %HA agree with prediction by ERF (no statistical test).<br><br>Response to change same direction and magnitude as estimated by ERF | Outdoor annoyance did not conform to ERF                                    |
| Vincent & Champelovier (1993) | France<br>Noise barriers and low noise road surface | B/A study at 2(?) sites.   | 75<br><br>Response rate not reported  | L <sub>eq,12h</sub> 65.1<br>Location of measurement site relative to Ps not reported | L <sub>eq,12h</sub><br>56.3<br>Location not reported | Change in levels was variable with distance from road: -10 to -3dB between 10 and 100m.  | % highly annoyed (scale and definition of HA not reported).<br>B: 22%HA<br>A: 8%HA                                   | Yes<br><br>(but no statistical test)   | No comparison of change to any ERF  | Author notes that response to "Often disturbs sleep" dropped from 13% to 6% |

# WEGVERKEER BRONNEN

## 33 studies

|  | No. of papers | I. Health outcome changed |    |      | II. Magnitude of change in health outcome     |                 |      |
|--|---------------|---------------------------|----|------|---|-----------------|------|
|  |               | YES                       | NO | n.a. | Magnitude <i>at least</i> as predicted by ERF | Excess Response | n.a. |
| <b>Outcome: Annoyance (23)</b>             |               |                           |    |      |   |                 |      |
| A Source Intervention                      | 9             | *****                     |    | **   | *****   | *****           | **   |
| B Path Intervention                        | 6             | *****                     |    |      | ***   | **?             | **   |
| C New/Closed Infra structure               | 2             | **                        |    |      | **  | **              |      |
| D Other physical                           | 6             | *****                     |    |      |   |                 |      |
| <b>Outcome: Sleep Disturbance (6)</b>      |               |                           |    |      |   |                 |      |
| A Source Intervention                      | 1             |                           |    | *    |   |                 | *    |
| B Path Intervention                        | 2             | **                        |    |      |   |                 | **   |
| C New/Closed Infrastructure                | 2             | **                        |    |      |   |                 | **   |
| D Other physical                           | 1             | *                         |    |      |   |                 |      |
| <b>Outcome: Cardiovascular Effects (4)</b> |               |                           |    |      |   |                 |      |
| D Other physical                           | 4             | ***                       | *  |      |   |                 |      |

# VLIEGVERKEER BRONNEN

## 7 studies

\* Statistisch significant volgens auteurs  
 \* Statistisch significant volgens reviewers

### AIRCRAFT NOISE SOURCES (7)

#### Hinder

#### (4) I Uitkomst veranderd

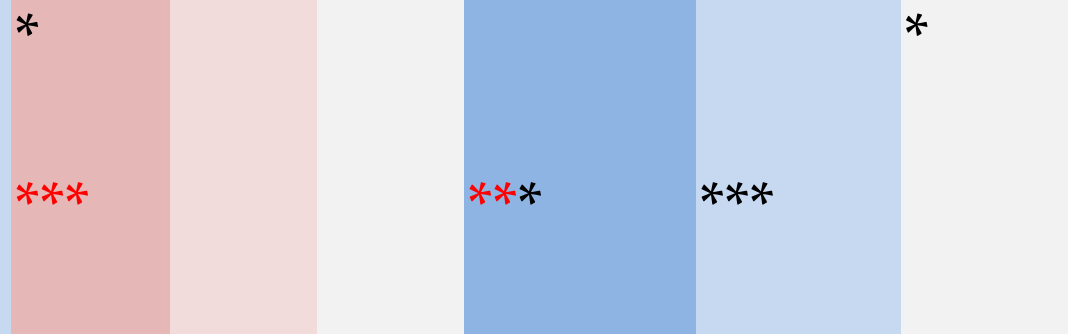
#### II Omvang

Ja

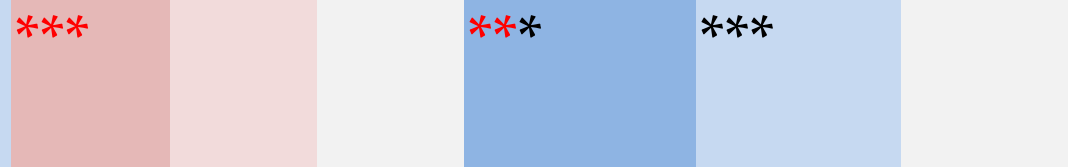
Nee

Minstens DR Overreactie nvt

B Path Intervention 1



C New/Closed Infrastructure 3



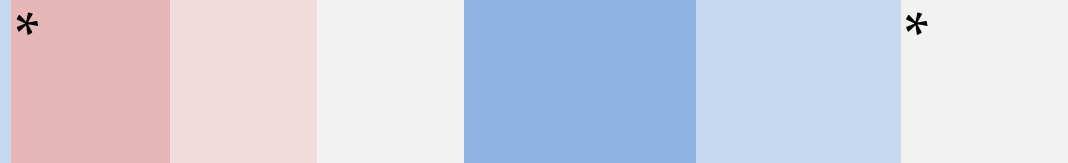
#### Slaap Verstoring (2)

C New/Closed Infrastructure 2

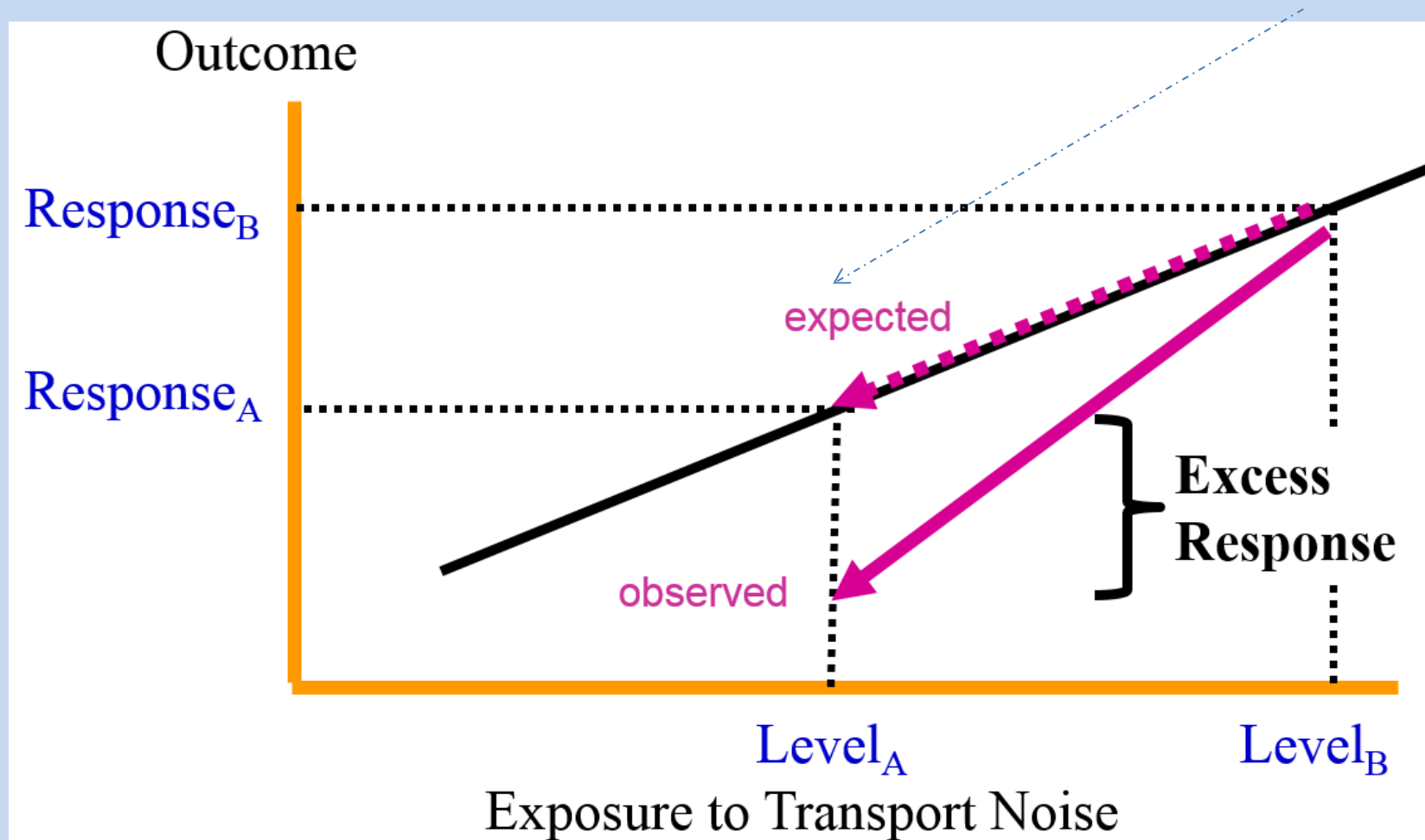


#### Cognitieve Ontwikkeling (1)

C New/Closed Infrastructure 1



**Grootte van verandering (veel) grotere dan was gebaseerd op basis van relevante DR relatie – (Excess Response\*)**



\* Brown & van Kamp JASA (2009a, 2009b)

# Conclusie mbt Interventies

- **Beperkt bewijs** voor effect van interventies : 33 wegverkeer; 7 vliegverkeere; 3 railverkeer.
- **Dun verspreid** over uitkomsten, bronnen en typen interventie.
- **MAAR:** voor weg en vliegverkeer zien we **een systematisch effect op hinder** (minder op slaap, hartvaat ziekten en cognitieve ontwikkeling)
- **De minimale verandering in hinder kan worden afgeleid van relevante dr – relatie** voor weg en vliegverkeer.
- **MAAR** Veel studies tonen een verandering die groter is dan op grond van dr-relatie voorspeld. **(Extra reductie)**

# Dank voor uw aandacht



**Binnenkort Publicatie in IJERPH**

**Systematic Review: Noise interventions and health - findings, policy implications and future research.**

Lex Brown & Irene van Kamp