BIRTH DEFECT CLUSTER INVESTIGATIONS: THE TEXAS EXPERIENCE AND SOME GENERAL QUESTIONS

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Outline

• Stages of a birth defects cluster investigation
• Summary of TX investigations conducted to date
• Some general questions
• Some lessons learned

Included in This Talk

Cluster investigations
• When occurrence of birth defects initiates concern
• Most focus of this talk

Small area investigations
• When some exposure initiates concern
Stages of a Birth Defects Cluster Investigation (the Texas Protocol)

1: Gather Initial Information

- Gather and provide information
- Criteria to proceed:
  - 3+ cases of the same defect or defect group

2: Are There More Cases Than We Expect?

- Assume all reported cases valid.
- Define time/place bounds, comparison area.
- Calculate rates using simple statistical software.
- Criteria to proceed:
  - Rate in target area is higher than comparison area AND
3A: Define “Case”, Find and Verify Cases

Case Definition
• Diagnosis, time, place

Case Finding and Verification
• Use Registry if possible (MUCH easier)
• Otherwise use vital records, hospital records, service providers

3B: Consider Environmental Info

• In a cluster investigation:
  • Usually only if informant mentions a specific environmental concern
• In a small area investigation:
  • Can be very helpful
  • Work with partners (e.g. environmental epi staff)

3C: Describe Cluster, Compare Rates

• Descriptive epidemiology:
  • Use final case definition
  • Person, place, time
  • Esp for small area investigations, see if cases live nearby
  • Compare crude rates
• Adjust for established risk factors:
  • Often use indirect standardization, may use direct
Criteria to Proceed

- Birth defects are the same or same type
- Rate in target area is higher than comparison area (or ratio > 1.00)
- Difference between rates is statistically significant
- Either of these is true:
  - 3+ cases with biologically plausible exposure OR
  - 5+ cases and observed rate >10x expected

4: Feasibility Study

- Consider:
  - Possible study designs, power
  - Any modifications to case definition
  - Additional case finding, verification, controls
  - Data collection methods
  - Resources required and available
- Criteria to proceed: If warranted

5: Try to Find What Caused the Cluster

- Base on feasibility study
- Use most cost-effective approach
Summary of Investigations Conducted to Date

Stage When Closed (% of 111 Closed Investigations)

1. Gather initial info: 23%
2. Compare to expected: 14%
3. Find, verify, describe, compare: 52%
4. Determine feasibility: 5%
5. Etiologic Study: 5%

Source of Requests (% of 127 Investigations)

- Public Health: 33%
- Service Provider: 36%
- Other: 10%
- Public Notice: 12%
Birth Defects Investigated (% of 127 Investigations)

- Multiple: 14%
- Other: 5%
- Chromosomal: 11%
- Heart: 8%
- Ear: 6%
- GI: 4%
- Gastroschisis: 10%
- Oral Clefts: 3%
- NTD / CNS: 22%
- All: 10%
- % of Investigations: 16%

Year Investigation Opened (# of Investigations)

- # of Investigations: 2, 4, 6, 8, 10, 12, 14, 16, 18

# Investigations by County

- El Paso, San Antonio, Brownsville, Houston, Dallas / Ft Worth, Corpus Christi
- Number of cases by county: El Paso, San Antonio, Brownsville, Houston, Dallas / Ft Worth, Corpus Christi
Some General Questions
What Should Be the Comparison Area?

Some options:
• Registry area or state
• Rest of region containing the target area
• If very small target area: Rest of city or county containing the target area
• County or city similar demographically
• Other?

The Challenge of Diagnostic Variability

• Some defects consistently diagnosed & recorded
  • Examples: anencephaly, gastroschisis

• Some vary with hospital, clinical practice, training, use of specialized equipment
  • Examples: ASD, microcephaly
  • Apparent “clusters” may be due to many

Which Birth Defects Should be Investigated?

If specified by informant, use those

If not specified (especially in small area investigations):
• Short list of defects?
• Hand pick some? E.g. low diagnostic variability defects?
• NBDPN defects or annual report defects?
• All defects collected?
Some Resources

• Data collection
  • Vital records (info on covariates, on denominators)
  • Epi Info: https://www.cdc.gov/epiinfo/index.html
  • Environmental Public Health Tracking
• Data analysis
  • WINPEPI (PEPI for Windows): http://www.brixtonhealth.com/pepi4windows.html
  • Epi Info: https://www.cdc.gov/epiinfo/index.html

Should We Keep Doing These Investigations?

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<tr>
<th>CONS</th>
<th>PROS</th>
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<tbody>
<tr>
<td>Require significant time (e.g. wait for Registry) or resources;</td>
<td>Public health duty / try to address concern of residents</td>
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<tr>
<td>Rarely find cause of the cluster or easily interpretable link of env'tal concern with BDs</td>
<td>May alleviate concern if occurrence:</td>
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<tr>
<td></td>
<td>• Not significantly elevated</td>
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<tr>
<td></td>
<td>• Not associated with env'tal factor</td>
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<tr>
<td>Very rarely find a new cause of birth defects</td>
<td>May help keep BDs in public eye</td>
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<td>May help with program funding</td>
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Identify Areas Proactively as Well as Reactively?

• If previous answer = yes...
  Consider:
  • Worth resources? (staff time, etc.)
  • If do repeatedly, good to have protocol
  • One potential software program: SaTScan (Space And Time Scan Statistic)
Some Lessons Learned

Methodology

- Protocol can be helpful
- Probably don’t do all birth defects
- Investigation MUCH easier using Registry data than other sources
  - Cases already found and verified
  - Comparison rates easy to calculate

Communication

- Educate informants early; manage expectations
- Keep as open as possible with informants and media throughout investigation
- Get training in risk communication and dealing with the media
Thanks

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