GROUP SESSION 4:

EARLY WARNING ASSESSMENT TOOLS AND

THE UN FRAMEWORK OF ANALYSIS FOR ATROCITY CRIMES

EARLY DETECTION AS A

BRICK IN THE PREVENTION ARCHITECTURE

DR. BIRGER HELDT (HELDTB@YAHOO.COM)
PREPARED FOR PRESENTATION AT GAAMAC II, MANILA,
2-4 FEBRUARY 2016
[…] when it [the Convention] talks about intent, how can anyone prove intent if the relevant archives are closed, or if the instructions to murder were transmitted orally? Hitler never gave a written order to murder all the Jews. You judge intent by the result and by circumstantial evidence, and by documents that make it clear there was intent without saying so explicitly, as was done by the International Criminal Court dealing with the Srebrenica case, and indeed elsewhere as well. (Bauer 2009: 27)

Most genocides leave very little incontrovertible documentary evidence of the intention to exterminate victims […] we can infer an intentional plan to destroy a group to the extent that violence becomes more lethal, appears coordinated and sustained over time, and targets an increasingly wider proportion of the victim group. This certainly does not meet the legal threshold of the strict intentionality for individuals, but it captures, in a rough way, the onset and diffusion of genocide, and may be of more utility to policy makers when atrocities are ongoing. (Verdeja 2012)
SOME PRELIMINARIES

- Risk Assessments identify **where** genocide may occur, but not when
  - Slow-moving risk factors, causes: rich in prevention implications
  - Earth-quake analogy: areas at high risk, “just a question of time”
  - Generates “watch-list” or “areas of concern”, for follow-up

- Early Warning identifies **when** G/M may take place but not where
  - Fast-moving events/triggers: rich in prevention implications
  - Starting point for analysis: Watch-list or areas of concern

- Risk Assessments matured more than Early Warning? Overlapping?
- Risk Assessment/Early Warning: hard, expensive, many moving parts
THE “WARNING-RESPONSE GAP”

• “Warnings not acted upon”, “Missed opportunities”

1. Warning Location challenge
   • Inhouse/integrated early warning units
     • Already exist (OSCE, etc.): but seldom Genocide/atrocity focus
   • Civil-society initiatives
     • Remote from decisions: a gap by definition
     • Many voices: grass roots, academics, NGOs, universities
     • Difficult to get an overview and sort through; “outsourcing”

2. Warning Quality challenge
   • Many alarms, can all be acted upon? Many moving parts, hard
THE “WARNING-RESPONSE GAP”

- Possible contributing factors for warning-response gap
  - Many models, different predictions, different risks/rankings
    - Which one to trust? Precision actionable?
  - Many suppliers: diverse, fragmented, contradictory voices
  - Models better at **where** than **when** (this year?; in 5 years?)
    - Watch lists are too long? How to prioritize?
  - How much better can Risk and Early Warning models become?
  - And how easy is it to act on those warnings?
CAN WE CLOSE THE GAP?

- Will we ever get really good at predicting genocides?
  - Rare events (50), small empirical learning basis: less EW accuracy

- Will we ever get really good at predicting mass atrocities?
  - Common events, large empirical learning basis: more EW accuracy

- But easier to respond to genocides than non-genocidal atrocities?
  - Genocide = victim identification by some group identity or feature,
    - Potential victims identifiable, locateable and in theory protectable
  - Non-genocidal atrocities = victim may have no specific identity
    - Physical protection efforts difficult: everyone may be at risk
CHANGED CONCEPT: ATROCITIES AS A DISEASE

• Is there a complement to current Early Warning practice, that…
  • Has small data requirements: no need for Big Data?
• Is consistent and easy to apply?
• Does not require understanding the causes/drivers?
  • Does not require that causal models are developed?
• Does not focus on the volume of violence?
• Requires fatality data only? Uses nifty analysis tools?
• Involves early detection approaches with resemblance to tried and tested principles within epidemiology?
LEARNING FROM DISEASE SURVEILLANCE

- Originated in manufacturing industry; now common in epidemiology
- Automated early detection mechanisms in a number of countries
  - SARS, leukemia, flue, food poisoning, malaria, crime (“hotspots”), …
  - Advanced approaches, refinements last 15 years: extensive literature
- Unifying principles of epidemiology early detection mechanisms
  - 1. Identify a baseline
  - 2. Surveillance: add continuous data feeds from various sources
  - 3. Look for anomalies: set warning levels; apply nifty analysis tools
    - Not technologism; just consistent analysis
  - 4. Experts assess validity of alarms before action is taken
• Add whether - early outbreak detection - to when and where
  • atrocities as a disease

• Only 1 moving part to consider: fatality data, and only little of it

• Genocide, mass atrocities: deaths non-random, systematic, intentional
  • “Genocide is a process not an event” (Rosenberg, 2012)

• Look not for deviant volumes, but deviant patterns of violence in time and space
  • Volume baseline not needed/possible

• Look for statistically unlikely patterns (not volumes) in casualty data
  • Indicates interconnected deaths = underlying process (targeting)
SOME TECHNICAL ISSUES

- Look for deviations from **Poisson Distribution** in time/space
  - Assess whether deaths at $T_1$ are independent from deaths at $T_2$
    - If deaths occur independently of one another, then "accidental"
    - Else, clusters of low death numbers; clusters of high death numbers
- Minimal data needs, simple to carry out, old statistical tool, widely used
  - Formally: look for “over-dispersion” in data; calculate test statistics
- Poisson applications with focus on patterns, not volumes, are rare
  - L. F. Richardson (1944): “Distribution of War in **Time**”. “War onset at time $T$ contingent on war during at time $T-1$?”. Finding: No!
  - Clark (1946): V1, V2 bombs over London 1944 fell in clusters or at random across **space**? Finding of 1 page study: Let us have a look…
AN APPLICATION OF THE POISSON DISTRIBUTION

BY R. D. CLARKE, F.I.A.

of the Prudential Assurance Company, Ltd.

Readers of Lidstone's Notes on the Poisson frequency distribution (J.I.A. Vol. lxxi, p. 284) may be interested in an application of this distribution which I recently had occasion to make in the course of a practical investigation.

During the flying-bomb attack on London, frequent assertions were made that the points of impact of the bombs tended to be grouped in clusters. It was accordingly decided to apply a statistical test to discover whether any support could be found for this allegation.

An area was selected comprising 144 square kilometres of south London over which the basic probability function of the distribution was very nearly constant, i.e. the theoretical mean density was not subject to material variation anywhere within the area examined. The selected area was divided into 576 squares of \( \frac{1}{4} \) square kilometre each, and a count was made of the numbers of squares containing 0, 1, 2, 3, ..., etc. flying bombs. Over the period considered the total number of bombs within the area involved was 537. The expected numbers of squares corresponding to the actual numbers yielded by the count were then calculated from the Poisson formula:

\[
N = \frac{m^m e^{-m}}{m!}
\]

where

\[
N = 576 \quad \text{and} \quad m = \frac{537}{576}.
\]

The result provided a very neat example of conformity to the Poisson law and might afford material to future writers of statistical text-books.

The actual results were as follows:

<table>
<thead>
<tr>
<th>No. of flying bombs per square</th>
<th>Expected no. of squares (Poisson)</th>
<th>Actual no. of squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>226.74</td>
<td>229</td>
</tr>
<tr>
<td>1</td>
<td>211.39</td>
<td>211</td>
</tr>
<tr>
<td>2</td>
<td>98.54</td>
<td>93</td>
</tr>
<tr>
<td>3</td>
<td>30.62</td>
<td>35</td>
</tr>
<tr>
<td>5 and over</td>
<td>7.14</td>
<td>7</td>
</tr>
<tr>
<td>576-00</td>
<td>1.57</td>
<td>1</td>
</tr>
</tbody>
</table>

The occurrence of clustering would have been reflected in the above table by an excess number of squares containing either a high number of flying bombs or none at all, with a deficiency in the intermediate classes. The closeness of fit which in fact appears lends no support to the clustering hypothesis.

Applying the \( \chi^2 \) test to the comparison of actual with expected figures, we obtain \( \chi^2 = 1.17 \). There are 4 degrees of freedom, and the probability of obtaining this or a higher value of \( \chi^2 \) is .88.
CLARK (1946): 537 V1/2 HITS AT RANDOM?

Illustration: http://bias123.com/clustering_illusion
CLARK’S STUDY OF 1946

- Divided Southern London in 576 squares
- There were 537 hits over these 576 squares
  - Observed rate in line with expectations of the Law of Small Number
- Conclusion: South London hit randomly = factories not higher risk

<table>
<thead>
<tr>
<th>No. of flying bombs per square</th>
<th>Expected no. of squares (Poisson)</th>
<th>Actual no. of squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>226.74</td>
<td>229</td>
</tr>
<tr>
<td>1</td>
<td>211.39</td>
<td>211</td>
</tr>
<tr>
<td>2</td>
<td>98.54</td>
<td>93</td>
</tr>
<tr>
<td>3</td>
<td>30.62</td>
<td>35</td>
</tr>
<tr>
<td>4</td>
<td>7.14</td>
<td>7</td>
</tr>
<tr>
<td>5 and over</td>
<td>1.57</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>576.00</td>
<td>576</td>
</tr>
</tbody>
</table>

(Table copied from Clark [1946])

- Now, let us use this approach in an application on actual fatality data
  - Goal: assess whether violence systematic or random = assess intent
A REAL WAR DATA EMPIRICAL APPLICATION

- Real war data, 38 weeks from week 15 of a year: 6141 deaths
- Visual inspection: are the deaths random or systematic?

![Timeseries of killed civilians](image-url)
Statistics: Observed pattern inconsistent with predicted pattern

Violence is not random

A REAL WAR DATA EMPIRICAL APPLICATION
A REAL WAR DATA EMPIRICAL APPLICATION

- Previous real data adjusted: values over 200 divided by 10
- Visual inspection: the deaths randomly distributed this time?
A REAL WAR DATA EMPIRICAL APPLICATION

- Statistics: observed pattern still inconsistent with predicted pattern: $P=2/100,000$
  - Violence is not random
ON THIS SIMPLIFIED APPLICATION

- Data was Bosnia, April-Dec. 1992; Moslems killed by Serbs (data: Schneider, Bussman&Ruhe, 2012, *International Interactions*)
  
- Data from an actual genocide: data was heavily “over-dispersed”
  - Deaths not randomly distributed = killings were systematic

- When the real data was adjusted for just 6 extreme observations
  - Less easy to visually discern killings as intentional
  - Yet, statistical approach easily caught the systematic pattern

- Data was for 38 weeks to illustrate post-morten analysis
  - Moving data for a much shorter time period could have been used, to allow early detection: prospective analysis
STRENGTHS OF APPROACH

• Consistent
• Catches patterns beyond human eye; precise/accurate/consistent
• Small forensic data needs, violence magnitude issue side-stepped
  • Catches low-level cases.
• Automatable in early detection system; low-cost; “in-sourceable”
• Can be used for post-morten forensic analysis purposes.
  • Supplementary forensic evidence in international crime courts like DNA evidence?
• Can be applied on other events of concern: rapes, expulsions, etc.
• Not only the only evidence, but a consistent decision support tool
LIMITATIONS OF APPROACH

- Addresses not **where** or **when**, but **whether**
  - Narrow task, easier than early warning and risk assessment
- Requires killings have started, but still time for early action
- No prevention implications; focus on the detection problem
  - Does not consider causes and triggers; not forecasting
- Method assumes constant propensity of killings: seasonal effects?; etc?
  - Core issue that needs to be addressed in applications: **apply method**, **interpret results with great care**
    - The illustration on Bosnia was simplified for illustrative reasons
THANK YOU FOR YOUR ATTENTION