# Enhanced Surveillance for Mass Gatherings
# 大型集会的强化监测

Aaron Fleischauer, PhD, MPH
Centers for Disease Control and Prevention
美国疾病预防控制中心

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# Rationale
# 基本原理

- Mass gatherings will impact public health and medical services infrastructure
  大型聚会通常会涉及公共卫生和医疗服务问题
  - Sanitation, food, water safety
    卫生设施、食品、饮水安全
  - Medical care
    医疗
- Role for public health surveillance:
  公共卫生监测的作用：
  - Detection of outbreaks, injury clusters
    发现暴发、群发性伤害
  - Medical surge capacity surveillance
    监测医疗急救能力

# Implementing Syndromic Surveillance
## 症状监测的实施

- What is Syndromic Surveillance?
  什么是症状监测？
- How it works?
  如何开展症状监测？
- What are the challenges and limitations?
  症状监测的挑战和局限性是什么？
- Where syndromic surveillance complements traditional surveillance?
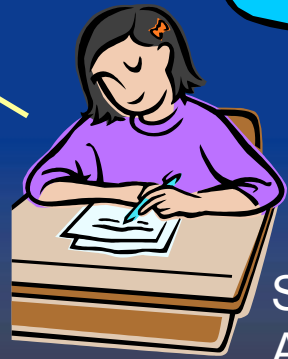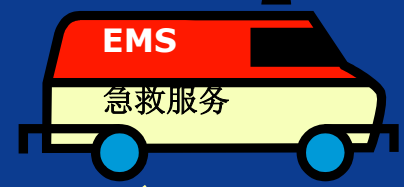  症状监测哪些方面对传统监测做了补充？
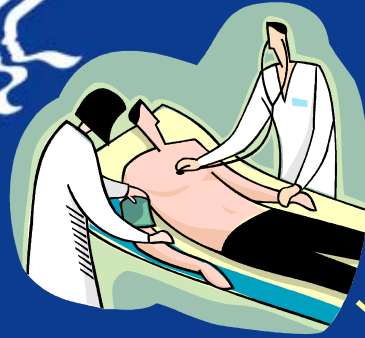- How much does it cost?
  成本有多大？

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# Definition
# 症状监测的定义

"The collection and analysis of health-related data that precede diagnosis and *signal* with *sufficient probability* a case or an outbreak to *warrant further public health response*."

"收集和分析确诊前与卫生相关的数据和某一病例或某次暴发充足的疑似信号，为下一步公共卫生应答提供证据。"

Laboratory Tests
实验室检测

EMS
急救服务

Nursing Hotlines
看护热线

Emergency Departments
急诊室

Poison Control
中毒控制

**Syndromic Surveillance Data Sources**

症状监测数据源

Prescription Drugs

处方药

Veterinarian Clinics
兽医诊所

School Absentee
缺课学生

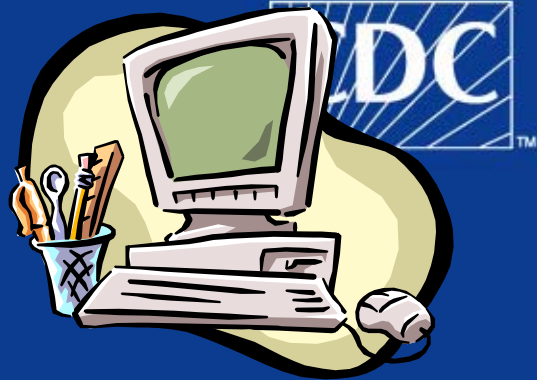Over-the-counter
非处方药

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ED collects data
on each patient
急诊室收集每
个患者的信息

**Step 1**
**Syndromic**
**Surveillance**
**Process**
第一步
症状监测程序

Send data (e.g., 24 hours) via secure server to Health Department

通过安全的服务器将数据（如，24小时之内）传输到卫生部门（HD）

ED collects data on each patient

**Step 2**
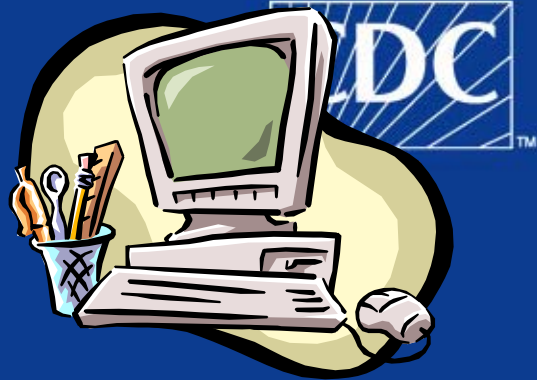**Syndromic**
**Surveillance**
**Process**
第二步
症状监测程序

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# Electronic ED Data
# 电子传输ED数据

```
Date        Time   Sex     Age Birth date Chief Complaint
-----------------------------------------------------------
08/08/2004 00:28 Female    13 01/31/1991 MIGRAINE NAUSEA
08/08/2004 00:38 Female    29 08/23/1974 ████████████████
08/08/2004 00:50 Male      48 09/01/1955 ANIMAL BITE
08/08/2004 01:44 Male      53 07/29/1951 ABD PAIN,GENERAL
08/08/2004 09:00 Male       6 02/16/1998 FEVER AND VOMITING
08/08/2004 09:21 Male      50 07/21/1954 SPRAIN ANKLE
08/08/2004 09:29 Female     1 03/21/2004 CRYING
08/08/2004 09:42
```

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Send data (e.g., 24 hours) via secure server to HD

ED collects data on each patient

Hospital can receive reports or view data

医院可以收到报告或观察数据

**Step 3**
**Syndromic**
**Surveillance**
**Process**
第三步
症状监测程序

HD performs aberration detection and analyses

HD进行异常识别和分析

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[ ] ✓ Upper or lower respiratory tract infection with fever
呼吸道感染伴随发烧

[ ] Diarrhea/ gastroenteritis 腹泻/肠胃炎

[ ] Rash with fever 皮疹伴随发烧

[ ] Sepsis or non-traumatic shock 脓血症或非创伤性休克

[ ] Meningitis or encephalitis 脑膜炎或脑炎

[ ] Botulism-like syndrome 波特淋菌中毒样症状

[ ] Unexplained death with history of fever 有发烧史的不明原因死亡

[ ] Lymphadenitis with fever 淋巴腺发炎伴随发烧

[ ] Localized cutaneous lesion 局部皮肤破损

[ ] 肌肉痛伴随发烧/寒战和不适

# EARS: Early Aberration Reporting System
## 早期异常报告系统（EARS）
## County X  X县
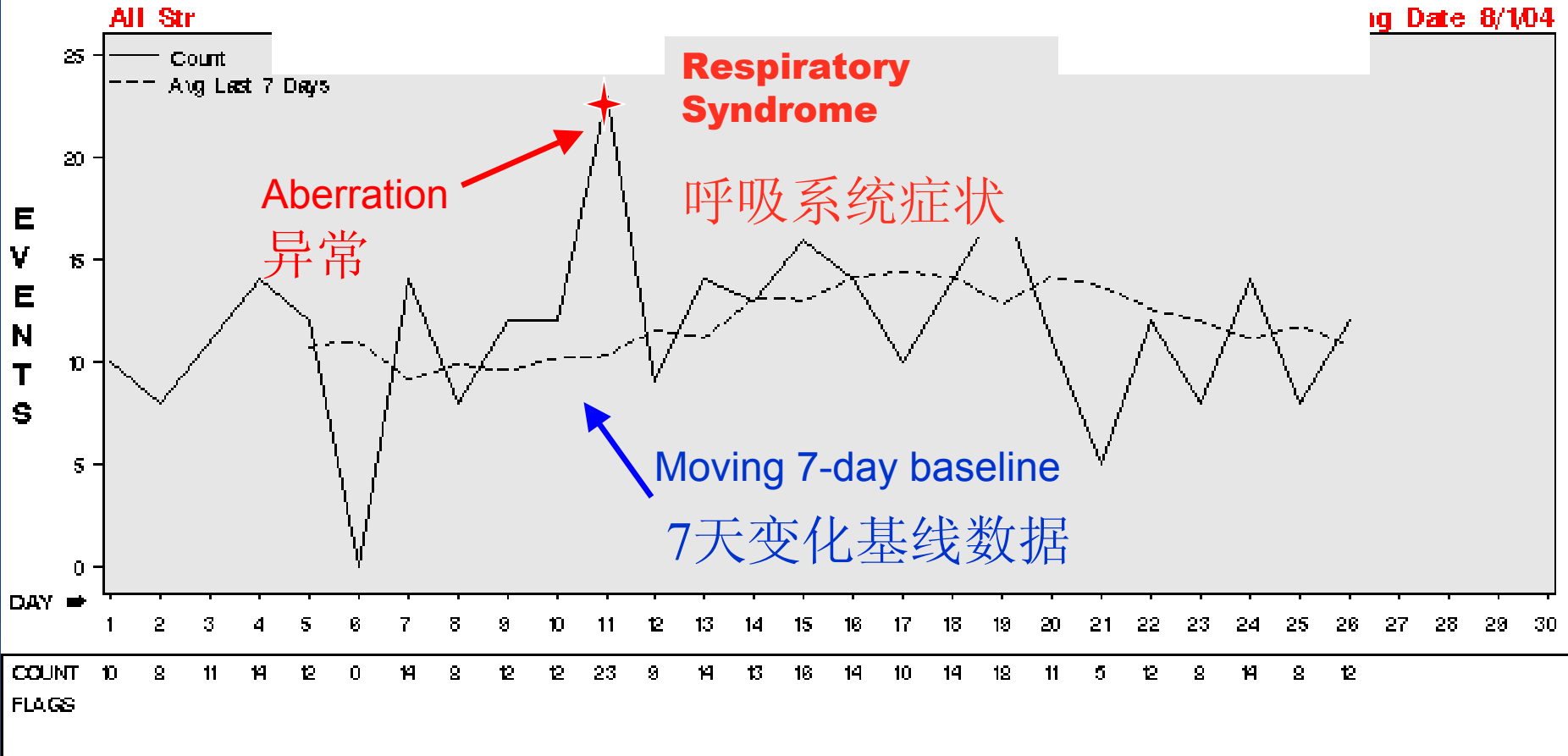
# Algorithms in EARS
# EARS的运算法则

- **CUSUM– Produced if sum of count differences from mean exceed threshold**

  累计和 -均数的数量差之和超过阈值时产生

- **C1– produced if daily count (rate) is 3 SD > mean of prior 7 day counts**

  每日数量（率）是 3个标准差超过前7天数量均数时产生

- **C2 – produced if daily count is 3 SD > mean of prior 3-9 day counts (rising baseline)**

  每日数量为3个标准差超过前3-9天数量（上升基线）的均数时产生

- **C3 – produced if sum of past 3 day count above mean (slowly rising baseline)**

  过去3天的数量之和高于均数（缓慢上升基线）时产生

Send data (e.g., 24 hours) via secure server to HD

ED collects data on each patient

Hospital can receive reports or view data

**Step 4**
**Syndromic**
**Surveillance**
**Process**
第四步
症状监测程序

HD performs aberration detection and analyses

Signals require further analysis and interpretation

需要进一步分析和解释的信号

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Send data (e.g., 24 hours) via secure server to HD

ED collects data on each patient

Hospital can receive reports or view data

**Step 5**
**Syndromic**
**Surveillance**
**Process**
第五步
症状监测程序

HD performs aberration detection and analyses

Epidemiologists investigate Signals

流行病学家对信号进行调查

Signals require further analysis and interpretation

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# What is a Signal?
# 什么是信号？

- What questions are being asked of this data?
  关于某数据要询问的问题是什么？
  - Specific questions to non-specific data
    关于非特异性数据的特异性问题
  - The variance in disease outcomes
    关于疾病结果的差异
- Limitations
  局限性
  - Signal to noise (false positives)
    受噪音干扰（假阳性）
  - Signal desensitization
    信号减敏
  - Cost and resources
    成本和资源

# Considerations
# 需要考虑的几个方面

- Baseline population at risk
  危险中的基线人群
- Expecting large increase in hospital visits
  预计医院就诊病人大幅增加
  - Resident population may leave town or postpone clinical visits
    居民会离开住所或拖延去门诊的时间
  - Visiting population typically healthy
    被关注的人群非常健康
  - Have not observed increase in general ED visits during mass gatherings
    大型聚会期间没有观察到急诊病人增加

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# How much does it cost?
## 症状监测的成本有多高?

Boston Health Department Syndromic Surveillance 2005 – 2006

2005 – 2006波士顿卫生局症状监测

| Phase (purchase costs and person time)<br>阶段（购买成本和人时间） | Cost (US $)<br>成本（美元） |
|---|---|
| Development and implementation<br>开发和实施 | 160,000 |
| Operation<br>使用 | 125,000 |
| Upgrades<br>升级 | 60,000 |
| Total<br>合计 | 345,000 |

# One Component
# 是监测系统中的一部分

- Syndromic Surveillance is one component of comprehensive infectious disease surveillance

  症状监测是综合性传染病监测的一个组成部分

- Enhance reportable disease by clinicians

  提高临床医生疾病报告程度

  - Make outbreaks of any kind & individual cases of unusual diseases officially reportable within 24 hours

    可使任何暴发或异常病例的官方报告在24小时内完成

- Electronic laboratory reporting with automated analysis capacity

  有自动分析功能的电子化实验室报告

- Environmental monitoring

  环境监测

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