SAS Log Analytics:
Revealing unwarranted data access in healthcare

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Introduction

- Oslo University Hospital (OUS)
  - 20000 employees
  - 1 200 000 admissions/consultations per year
- Access to electronic patient journals
  - Technical user rights
  - 75 million lookups/year
- Lookups are logged
Data inspectorate audit

**Laws and regulations**

The data governance authority at the hospital is responsible for protection of privacy. Responsibility lies with top management, CEO.

The management needs to take full responsibility for the security procedures, including logging of systems and the systematic analysis of logs.

**Risk**

Health providers lack sufficient procedures, processes and systems to meet the requirements.
Identifying unwarranted lookups

- Manual investigations
  - Complaints from patients
  - «Celebrities»
  - Random selection

- Rule based systems
  - Descriptions of allowed/forbidden – Exceptions?
Identifying unwarranted lookups – the SAS way

- Not fixed, predefined rules
- Statistical selection – manual verification
- Indications - Scenarios
  - Time
  - Person
  - Organisation
  - Medical (Topical)
  - Geographic
Time: Lookup vs. patient situation
Organisation: Lookup by employee
Organisation: Lookup by employee vs. dept.
Person: Lookup on patient
Person: Lookup on colleagues
## Scoring via the scenarios

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<th>Sc.3</th>
<th>Sc.4</th>
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\[ \sum \]
The scored data
The scored data
The scored data
The Project – 8 scenarios

- Unexpected lookup re time line
- Unexpected combination of organisations - employee vs. patient
- Lookups that are unusual re employee profile
- Number of patients looked at during a period
- Documentation?
- Employee interest vs. others in the same org. unit
- Employee interest vs. others in the same job
- Colleague lookups
The Project

- Ca. 7.3 million lookups analysed (aggregate 1h)
- Period 1/7 – 31/12-2011
- Data sources
  - Log
  - Employee registry
  - Patient administration system
The Project - Results

- The method sorts with success
- 33 lookups selected
- 29 considered unexplainable by management
- Employees were formally warned

- Success criteria met!
SAS Log Analytics

Production data
Employees
Patients
Lookups

Base tables

Scenarios, scoring

Reporting and investigation
SAS Log Analytics

- Identifies high risk lookups and individuals
- Minimalises false positives
- Gives a basis for manual verification
- Supports the investigation process
- Allows organisational aggregation
- Allows monitoring over time
- Respects the confidentiality of patient and employee
SAS Log Analytics - Clients and projects

- Ullevål Sykehus
- OUS
- Helse Møre og Romsdal
- Helse Nord

- Other industries
  - Bank and finance
  - Police, Public
  - Information sensitive industries