Krankenhaus-Infektions-Surveillance-System (KISS)  
Hospital Infection Surveillance System

CDAD-KISS

Protocol
Surveillance of Clostridium difficile-associated diseases in hospitals
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1. Purpose of CDAD monitoring for hospitals

CDAD-KISS is a module of the German Hospital Infection Surveillance System (Krankenhaus-Infektions-Surveillance-System = KISS) of the National Reference Center for the Surveillance of Nosocomial Infections (Nationales Referenzzentrum = NRZ). KISS has been used since early 1997 by an increasing number of hospitals in all of Germany to collect data and generate reference data on health care-associated infections (HAI) and certain pathogens.

Clostridium difficile is one of the most common anaerobic HAI agents. In addition to causing Clostridium difficile-associated diarrhea, it causes a number of severe illnesses including pseudomembranous colitis and the often deadly toxic megacolon. In the countries around Germany and in North America, the frequency of infection and death caused by this agent has increased rapidly in recent years. As of 2006 there were no current data about this pathogen’s prevalence or about illnesses caused by it in Germany. For this reason, it makes sense to carry out surveillance of Clostridium difficile-associated diseases in hospitals. Data related to CDAD frequency and about severe cases of CDAD in hospitals can be gained by surveillance. Outbreaks of CDAD can also be detected much earlier in this way. KISS monitoring is part of a hospital’s quality assurance program. Hospital-associated cases of CDAD and CDAD cases acquired prior to admission are included in CDAD-KISS.

This surveillance protocol serves to provide hospitals participating in KISS with necessary definitions and specifications. In this way, data collection and analysis can be standardized.

It is also possible for interested hospitals to collect data using this protocol without participating in KISS and then evaluate their results analogically. These hospitals can benchmark themselves with the reference data provided through CDAD-KISS.

The protocol is intended for interested hospital hygienists, infection control personnel and clinicians who want to be involved in CDAD surveillance.

All comments for improvement are welcome.
2. Requirements for participation by hospitals in CDAD-KISS and duties of KISS institutions

Participating hospitals must fulfill the following requirements:

- Employment of full-time infection control personnel or hygiene specialists
- Strict usage of the obligatory specifications found in this protocol (Additional information relevant for quality management may also be recorded in addition to the required data, of course)
- Data collection and transfer of hard copies of data yearly by mail or fax
- Preparedness to share descriptive parameters of the hospital (structural or procedural parameters of the care unit or hospital, e.g. number of beds)
- Preparedness to participate in validation measures

KISS institutions promise participants to:

- Provide expert advice and support during surveillance
- Handle data strictly confidentially
- Provide participating hospitals with data analysis

3. Methods

Participants

Any hospital can participate regardless of involvement with other KISS modules. CDAD data collection must take place for an entire hospital. However, the data collected are usually available in most hospitals.

The data should be collected and sent to the NRZ once per year (by March 31). Data collection takes only inpatients into account. Persons in outpatient care or “polyclinics” are not included in surveillance.

Calculation of CDAD rates

The following figures are calculated:

<table>
<thead>
<tr>
<th>Name</th>
<th>Calculation</th>
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<tbody>
<tr>
<td>Total incidence density</td>
<td>Total CDAD cases per 1000 patient days</td>
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<tr>
<td>Hospital-associated CDAD incidence density</td>
<td>Total in-hospital CDAD cases per 1000 patient days</td>
</tr>
<tr>
<td>CDAD prevalence upon admission</td>
<td>Total admitted cases of CDAD to hospital per 100 patients of that hospital</td>
</tr>
</tbody>
</table>

Stratification:

Depending on the number of participants, the data may be stratified by diagnostic method or size.

Comparison of CDAD rates

The above-named CDAD rates are calculated yearly by the NRZ for participating hospitals and made available for benchmarking.
Recommendations for data collection:
Experience has shown that surveillance based solely on laboratory confirmation can miss a significant number of CDAD cases. Those patients whose CDAD is endoscopically diagnosed, for example, tend to be ignored because their infection was not confirmed by the laboratory. In other cases, the infection can be found during an operation. In the worst case, an infection may be determined post mortem by the pathologist. For this reason, it is worthwhile to establish contact for data collection between surgery, endoscopy and pathology.

4. Documentation specifications (see CDAD-KISS form)

The data collection form can be accessed on the NRZ homepage at www.nrz-hygiene.de/en/surveillance/hospital-infection-surveillance-system/cdad-kiss/. The yellow fields should be completed.

CDAD: Clostridium difficile-associated disease. A CDAD diagnosis occurs when one or more of the following criteria are present.

CDAD case: A case of CDAD must fulfill one or more of the following criteria:

1. Diarrhea or toxic megacolon and proof of *C. difficile* toxins, or proof of toxin-producing *C. difficile* by culture in stool.
2. Pseudomembranous colitis determined by endoscopy.
3. Histopathological proof of *C. difficile* infection (with or without diarrhea) in endoscopy, colectomy or autopsy (ECDC definition).

Asymptomatic patients with positive culture or toxin evidence do not fulfill this definition.

The criterion should be given by which CDAD was primarily diagnosed. Only one criterion per patient is recorded; patients do not need to be tracked regarding fulfillment of the other criteria. If multiple criteria are fulfilled at the time of diagnosis, then give the criteria with the highest number. For example, a patient undergoes an operation because of megacolon, and histopathological proof of CDAD is a result. Evidence of toxins is found before the operation and diarrhea are recorded in the patient chart. In this case, both criterion 1 (diarrhea and proof of toxin) and criterion 3 (histopathological proof of *C. difficile* infection during colectomy) are present and only criterion 3 is recorded.

Both cases of CDAD and patients with CDAD are counted. Therefore, it is possible that several cases of CDAD can be from the same patient. The patient is counted only once per calendar year, but each case is counted separately.

For example, a patient comes three times during a calendar year with CDAD. The three cases of CDAD are counted separately, but the patient is counted only once.
CDAD cases are assigned to the department, unit or hospital in which they were first diagnosed. Cases are not recounted upon transfer within a hospital. If a patient remains on-station over the turn of the year, the case is counted only for the year of diagnosis.

**Year**
Date of calendar year in which observations took place

**Hospital abbreviation**
Enter the abbreviation given by the NRZ.

**Community onset CDAD (see diagram)**
CDAD was identified upon admission or CDAD symptoms appeared within the first three days after admission.

**Healthcare facility onset CDAD**
Definition for CDAD is fulfilled and symptoms **after the 3rd day** after admission.
OR
Definition for CDAD is fulfilled and symptoms appear **within the first three days** after admission, **only when patient had been treated in-patient in the same hospital within the last four weeks.** (Date of discharge no more than 4 weeks prior to date of admission).  
OR
Symptoms appear **up to 4 weeks after discharge from hospital** and the definition for CDAD is fulfilled.

**How to calculate length of stay**
Day of admission = Day 1 (Duration: 1 m to 24h)  
Healthcare facility onset is from Day 4 (minimum length of stay between 48h1m and 72h)

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<tbody>
<tr>
<td>Bed 1 Admis-sion</td>
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<tr>
<td>Hours of stay</td>
<td>0'00-24'00</td>
<td>24'01-48'00</td>
<td>48'00-72'00</td>
<td>72'01-96'00</td>
<td>96'01-120'00</td>
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<tr>
<td>Inpatient day</td>
<td>Day 1</td>
<td>Day 2</td>
<td>Day 3</td>
<td>Day 4</td>
<td>Day 5</td>
<td>Day 6</td>
<td>Day 7</td>
<td>Day 8</td>
<td>Day 9</td>
<td>Day 10</td>
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<tr>
<td>Time of sampling</td>
<td>Sample with proof of CDAD</td>
<td>Sample with proof of CDAD</td>
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<tr>
<td>Classification</td>
<td>Community onset CDAD</td>
<td>Healthcare facility onset CDAD</td>
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Admission Discharge  
4 weeks  
Community onset Healthcare facility onset Community Onset  
In hospital Outside of hospital
**Severe CDAD**  
A severe case fulfills one of the following four criteria:  
1. Necessity of re-admission because of recurrent infection  
2. Transfer to ICU for CDAD treatment or complications  
3. Invasive surgery (colectomy) because of megacolon, perforation or refractory colitis  
4. Death <30 days after diagnosis with CDAD as cause or contributing factor of death

**Total number of patient days**  
In general, hospital administrations count patient days as follows: the day of admission is the first day and the day of discharge is not counted. (For example, Patient A was in the hospital between the 1\textsuperscript{st} and 10\textsuperscript{th} of January or for 9 patient days).

**Total number of patients**  
Total number of all inpatients in the hospital between 1 January and 31 December of the year of data collection, not including internal transfers.
5. Legal Notice

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Contact persons for CDAD and their addresses can be found on the NRZ homepage, www.nrz-hygiene.de.

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