TEMADAG
HAIBA
(Hospital Acquired Infections Database)

Hoftealloplastik-registerets betydning for ortopædkirurgen

STATENS SERUM INSTITUT

Den kunstige hofte og bakterier

Søren Overgaard,
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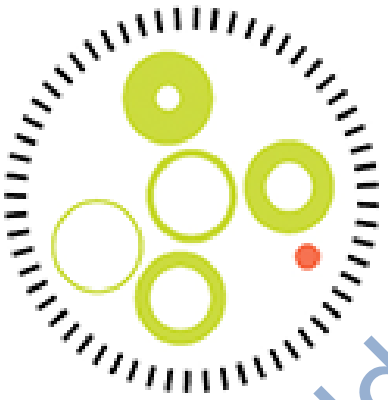
Department of Orthopaedics and Traumatology, Odense University Hospital,
Institute of Clinical Research, University og Southern Denmark
Denmark

Danish National Clinical Quality Databases

App. 70 databases



rkkp

regionernes kliniske kvalitetsudviklingsprogram

Danish Clinical Registries (RKKP)

Årsrapport 2018

Dansk Hoftealloplastik Register 1995-2017

Søren Overgaard, registerleder

Ortopædkirurgisk afdeling, Odense Universitetshospital

Dansk Hoftealloplastik Register – RKKP

Orthopaedic Research Unit – Dept. of Orthopaedic Surgery and Traumatology
Odense University Hospital
Dept. of Clinical Research – University of Southern Denmark – www.sdu.dk/ki/orto

Danish National Clinical Quality Databases

The goal of clinical quality databases ?

To improve the treament quality

Styregruppe

- Registerleder, professor Søren Overgaard, Odense Universitetshospital (Syddanmark)
- Overlæge, phd. Claus Varnum (Syddanmark)
- Afdelingslæge phd., Kirill Gromov (Hovedstaden)
- Overlæge, Martin Lamm (Midtjylland)
- Overlæge, phd., Mogens Berg Laursen, Aalborg Universitetshospital (Nordjylland)
- Overlæge Leif Broeng, Køge Sygehus (Sjælland)
- Overlæge, dr.med. Søren Solgaard, Gentofte Hospital(DSHK) (repræsenterer Dansk Selskab for Hofte- og Knæalloplastik Kirurgi)
- Klinisk epidemiolog Pernille Iversen, RKKP
- Lene Maria Andersen, (repræsentant for dataansvarlig myndighed, Region Hovedstaden)

Rapporten

- **DHR- rapporten 2018**
  - **www.sundhed.dk / www.dhr.dk**

Hvorfor

Dansk Hoftealloplastik Register 1995

Hvorfor

Dansk Hoftealloplastik Register 1995

Den kunstige hofte

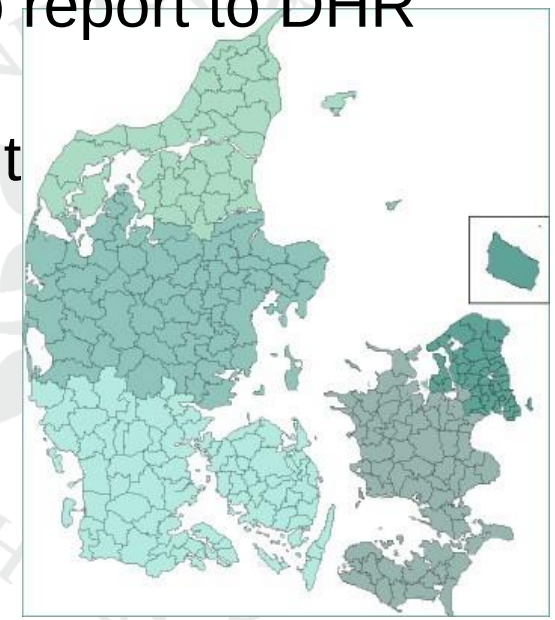
The objective of the DHR

- **To facilitate continuous improvement of the outcome following primary and revision surgery both at a national and local level by evaluating**
  - Patient related risk factors
  - Surgical technique related risk factors
  - Prophylactic and operation theatre related factors
  - Implant related risk factors

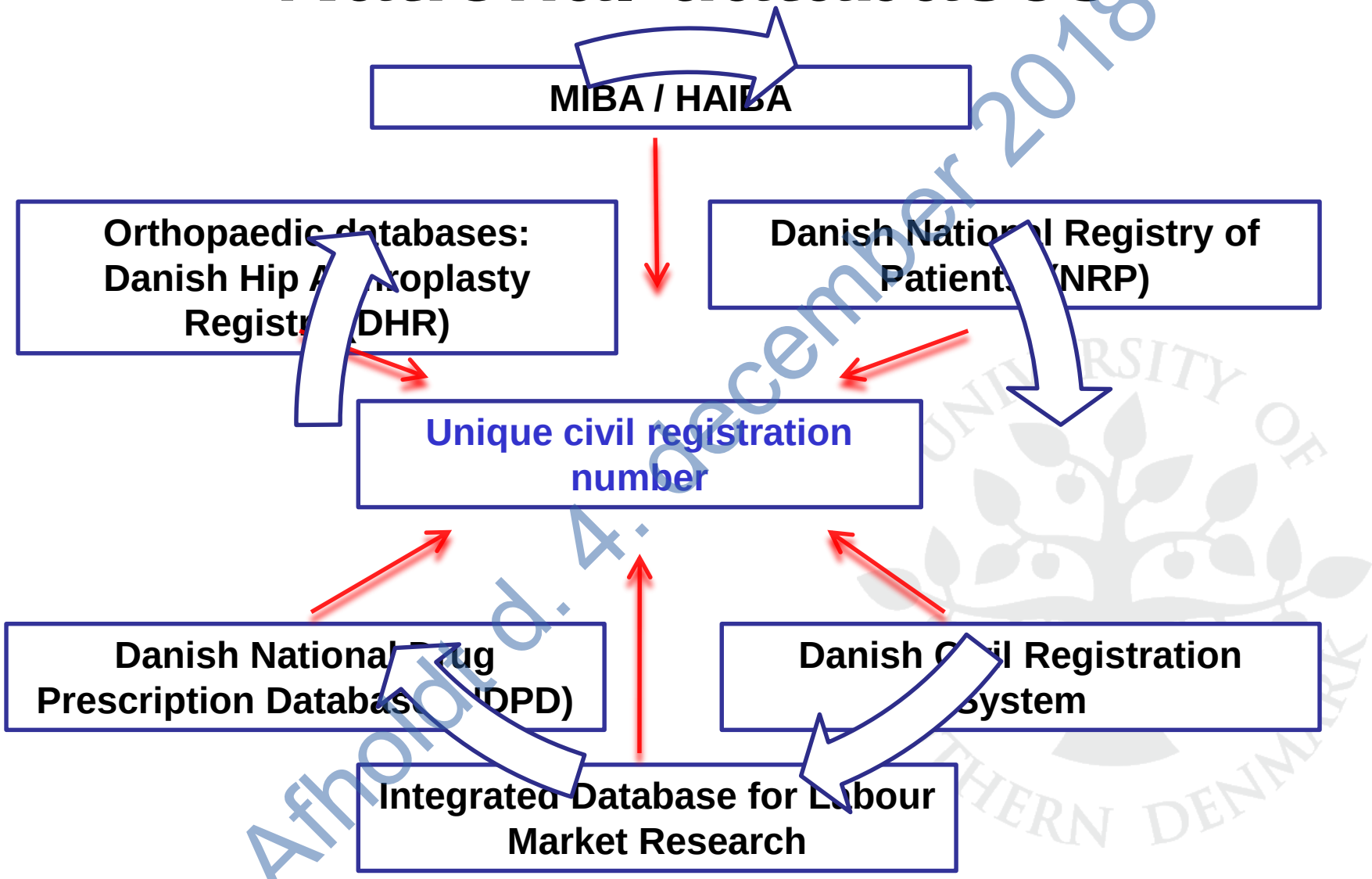
- **To examine the epidemiology of total THA in Denmark, including both primary and revisions surgery**

Denmark

- **According to rules from the Danish National Board of Health both**
  - all public and private clinics have to report to DHR (National database)
  - No requirement of informed consent



National databases



Mandatory for registers

- **Coverage: 100%**
- **Completeness > 95%**
  - **No bias in reporting: No systematic missing data**
- **Valid data**

A. B. Pedersen, S. P. Johnsen, S. Overgaard, K. Søballe, H. T. Sørensen and U. Lucht. Registration in the Danish Hip Arthroplasty Registry. Completeness of total hip arthroplasties and positive predictive value of registered diagnoses and postoperative complications. Acta Orthop Scand 2005; 75 (4): 434-441.

Kvalitetsindikatorer

1. Komplethedsgraden af indberetninger (proces)
2. Transfusionspraksis (proces)
3. Genindlæggelse indenfor 30 dage (resultat)
4
5

Ingen indikatorer fokuserer på mikrobiologi og forebyggelse af infektion efter hoftealloplastik

Kvalitetsindikatorer

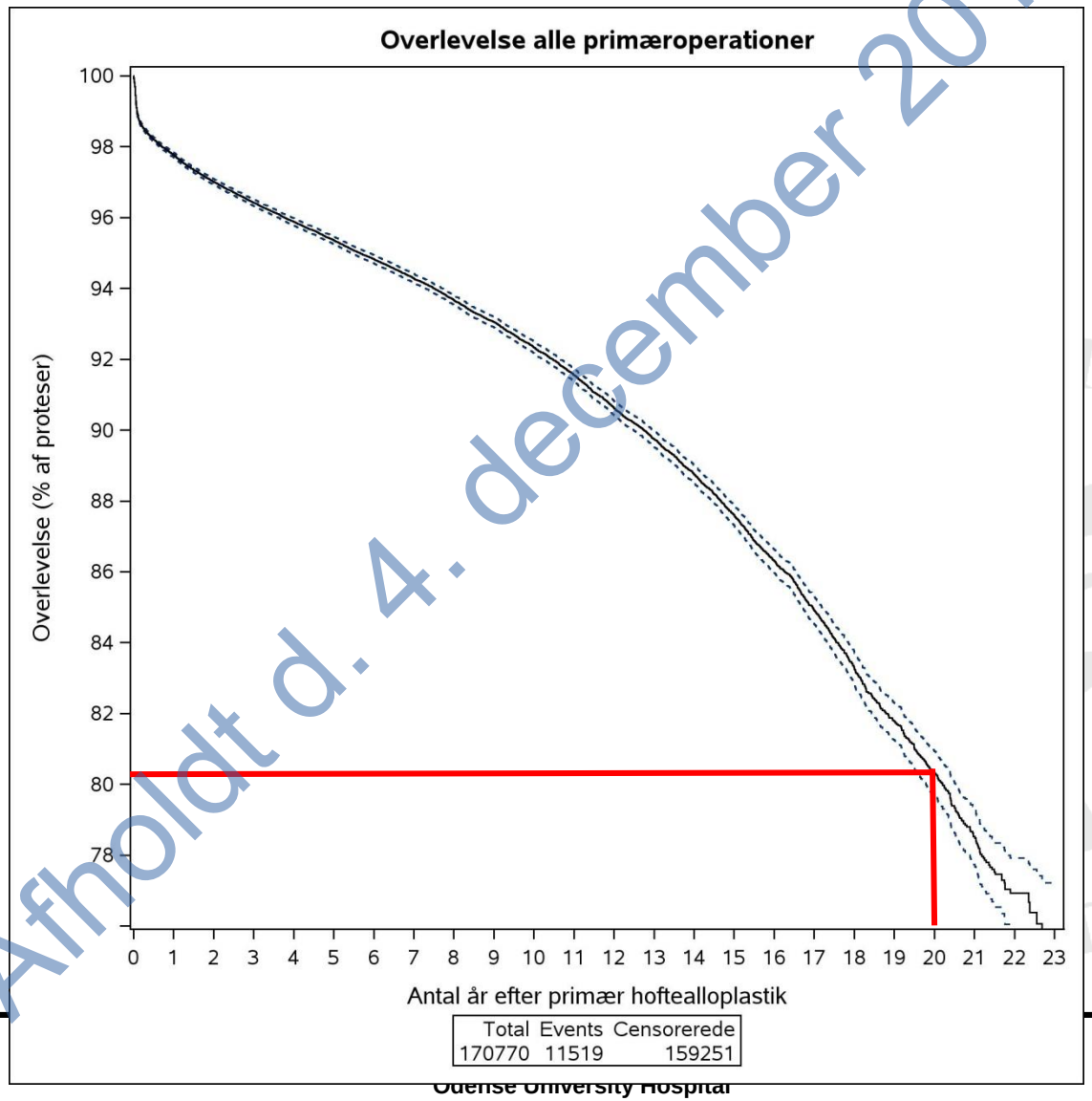
Ingen indikatorer fokuserer på mikrobiologi og forebyggelse af infektion efter hoftealloplastik

Relevant

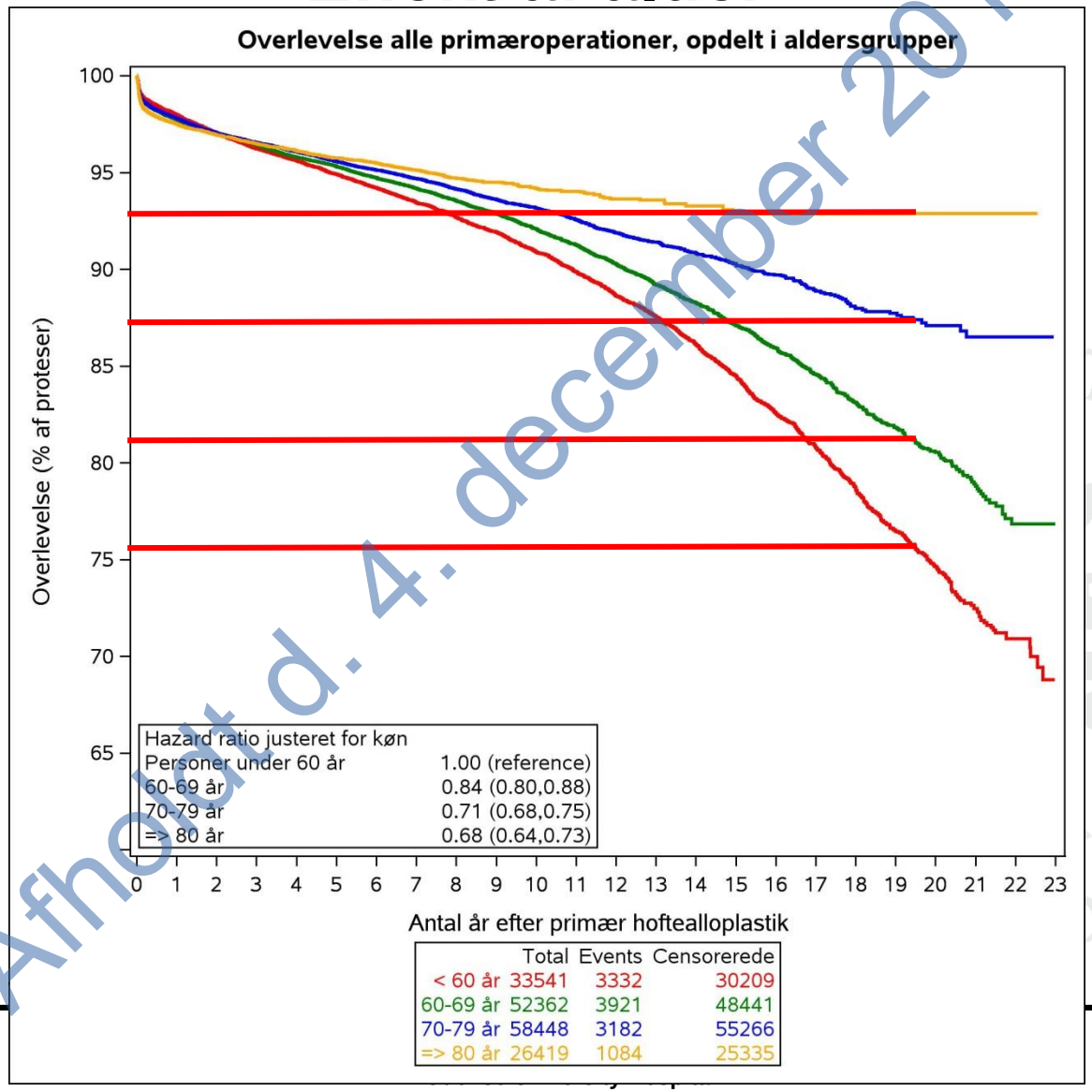
Kaplan-Meier kurver ved primær hoftealloplastik overall

Hvor længe holder en kunstig hofte ?

Kaplan-Meier kurver ved primær hoftealloplastik overall

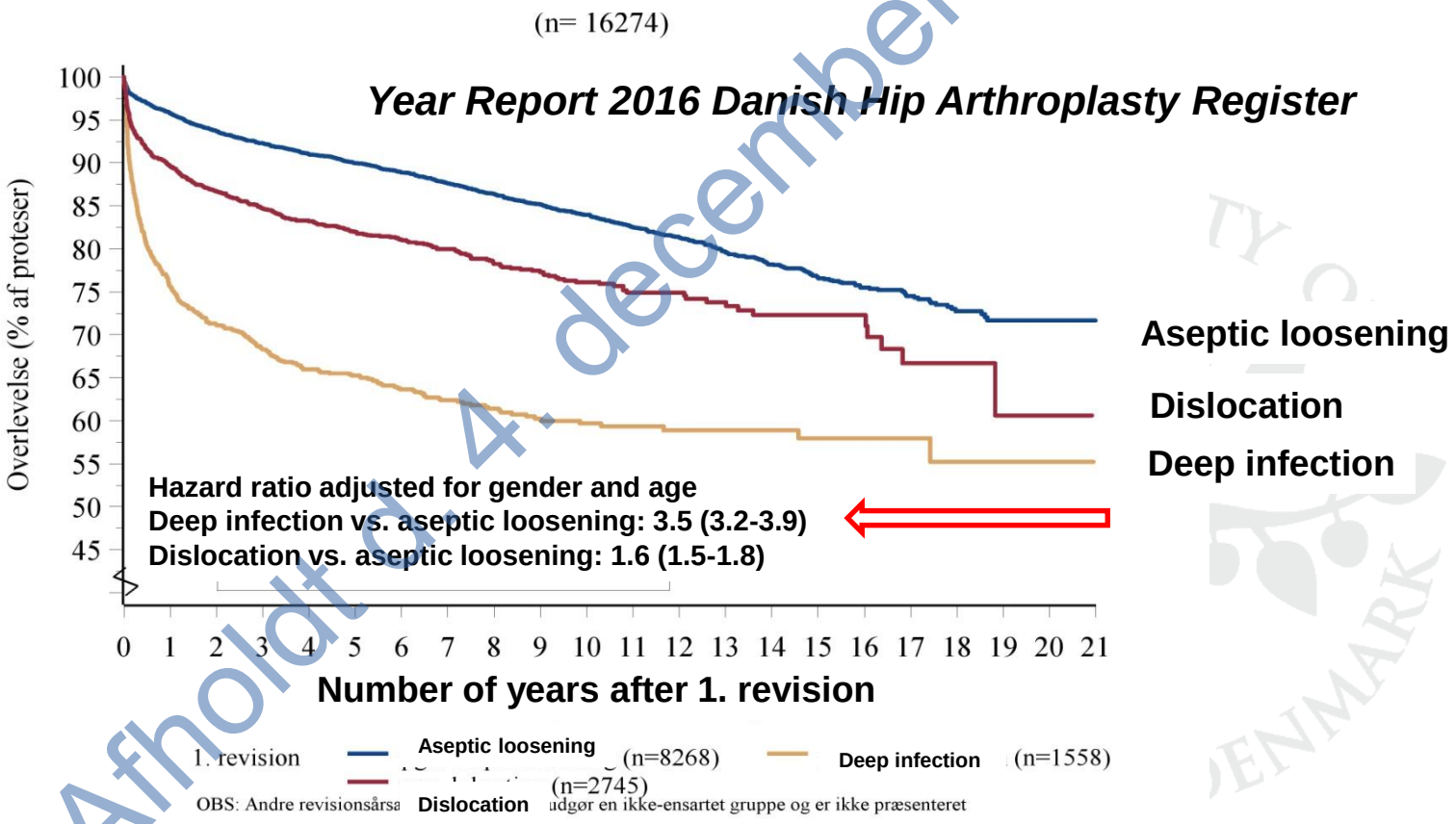


Kaplan-Meier kurver ved primær hoftealloplastik
Effekt af alder



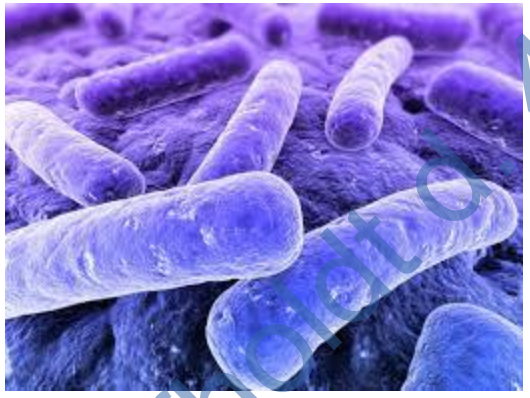
- **Prosthetic joint infection (PJI) is a serious complication**

Survival of the first revision with second revision as endpoint
Effect of first revision cause



Incidence of Prosthetic Joint Infection in hips

- Rare event ≈ 0.5-2 % in 5 years



Validation study: Denmark

Acta Orthopaedica 2015; 86 (3): 326–334

The "true" incidence of surgically treated deep prosthetic joint infection after 32,896 primary total hip arthroplasties

A prospective cohort study

Per Hviid GUNDTOFT[1,2,3], Søren OVERGAARD[2,3], Henrik Carl SCHØNHEYDER[4,5], Jens Kjølseth MØLLER[6,7], Per KJÆRSGAARD-ANDERSEN[8], and Alma Becic PEDERSEN[9]

[1] Department of Orthopedics, Kolding Hospital, Kolding; [2] Department of Orthopaedic Surgery and Traumatology, Odense University Hospital, Odense; [3] Institute of Clinical Research, University of Southern Denmark, [4] Department of Clinical Microbiology, Aalborg University Hospital; [5] Department of Clinical Medicine, Aalborg University, Aalborg; [6] Department of Clinical Microbiology, Vejle Hospital, Vejle; [7] Institute of Regional Health Research, University of Southern Denmark; [8] Department of Orthopedics, Vejle Hospital, Vejle; [9] Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus, Denmark.
Correspondence: per.hviid.gundtoft@rsyd.dk
Submitted 2014-06-24. Accepted 2014-12-05.

Background and purpose — It has been suggested that the risk of prosthetic joint infection (PJI) in patients with total hip arthroplasty (THA) may be underestimated if based only on arthro-

PJI is the third most common indication for revision of total hip arthroplasty (THA), accounting for approximately 15% of all revisions (Bozic and Rios 2005, Dale et al. 2012). Studies

Validation study: Denmark

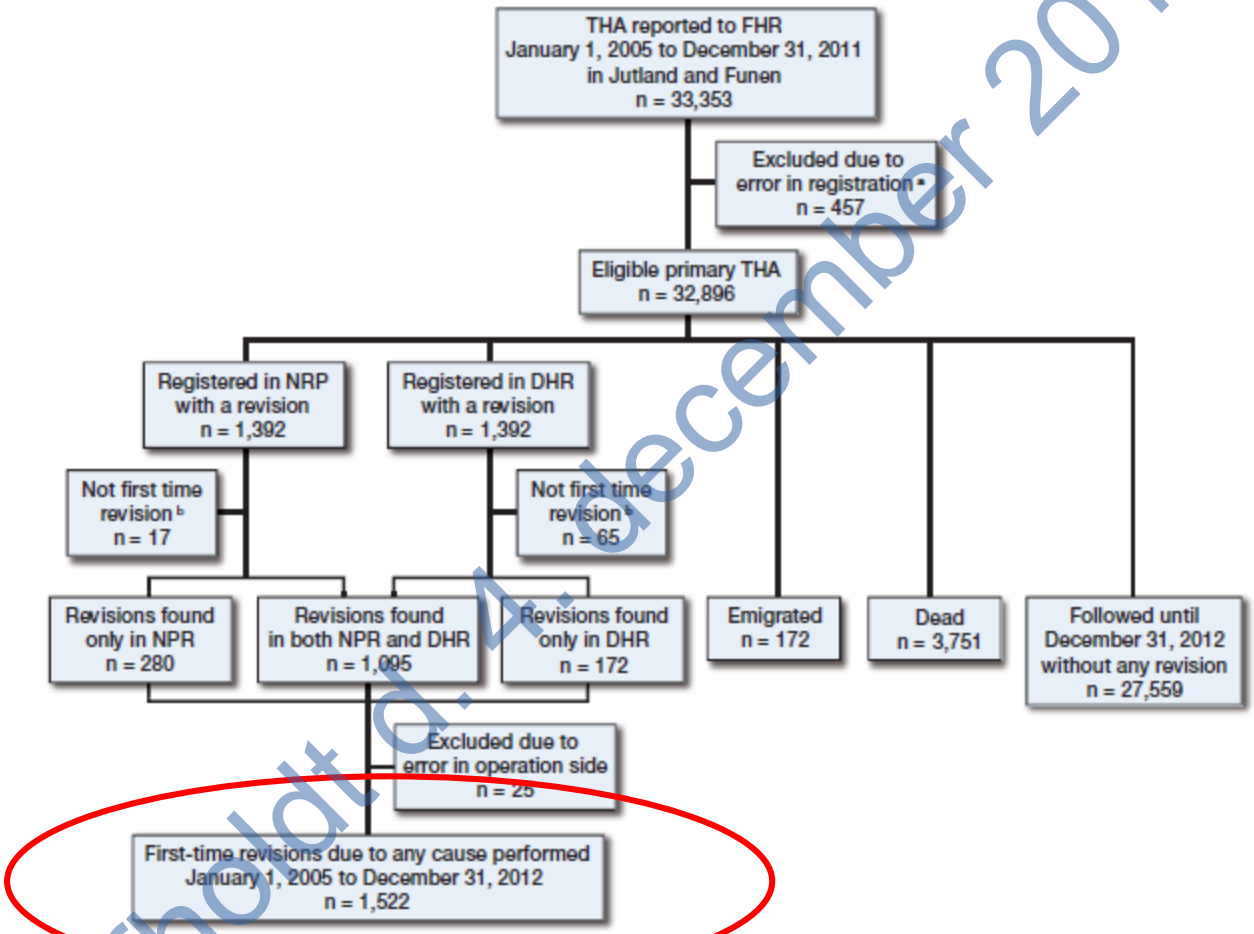


Figure 1. Revisions identified in either the DHR or the NRP.
[a] Missing or incorrect information regarding the civil registration number, operative side, date of operation, or indication.
[b] Excluded, as a previous revision was reported to the other registry.

Validation study: Denmark Algorithm

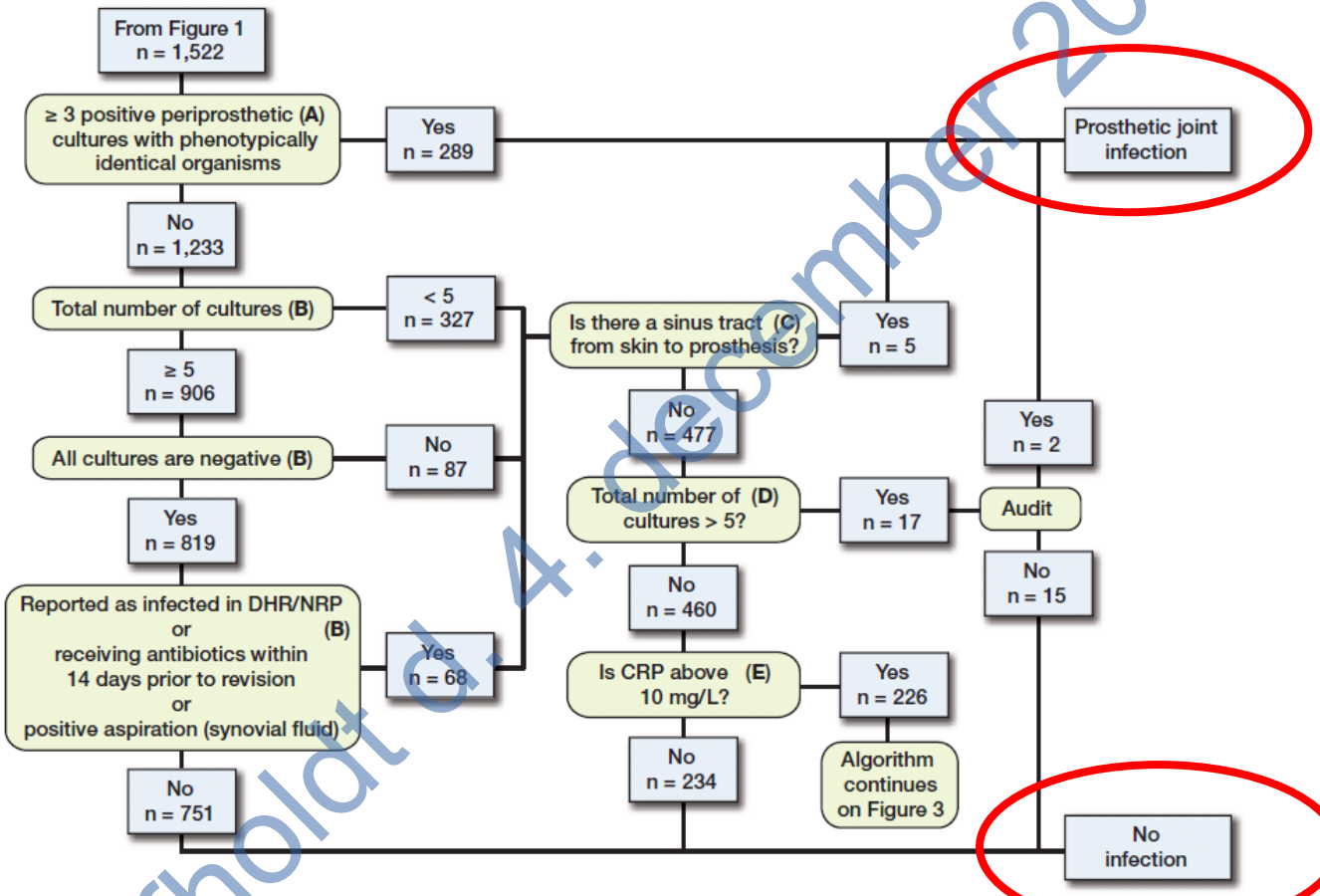
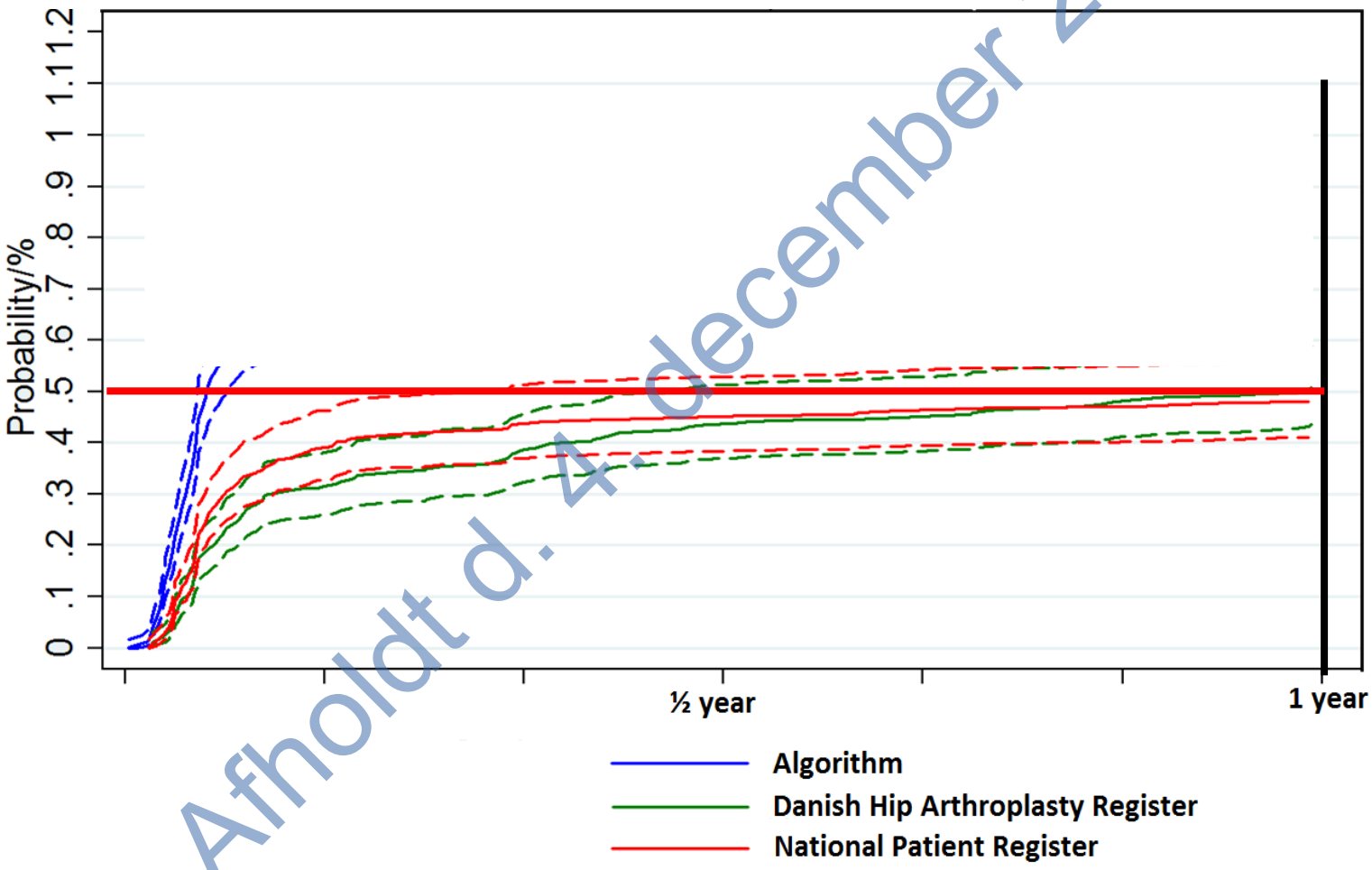
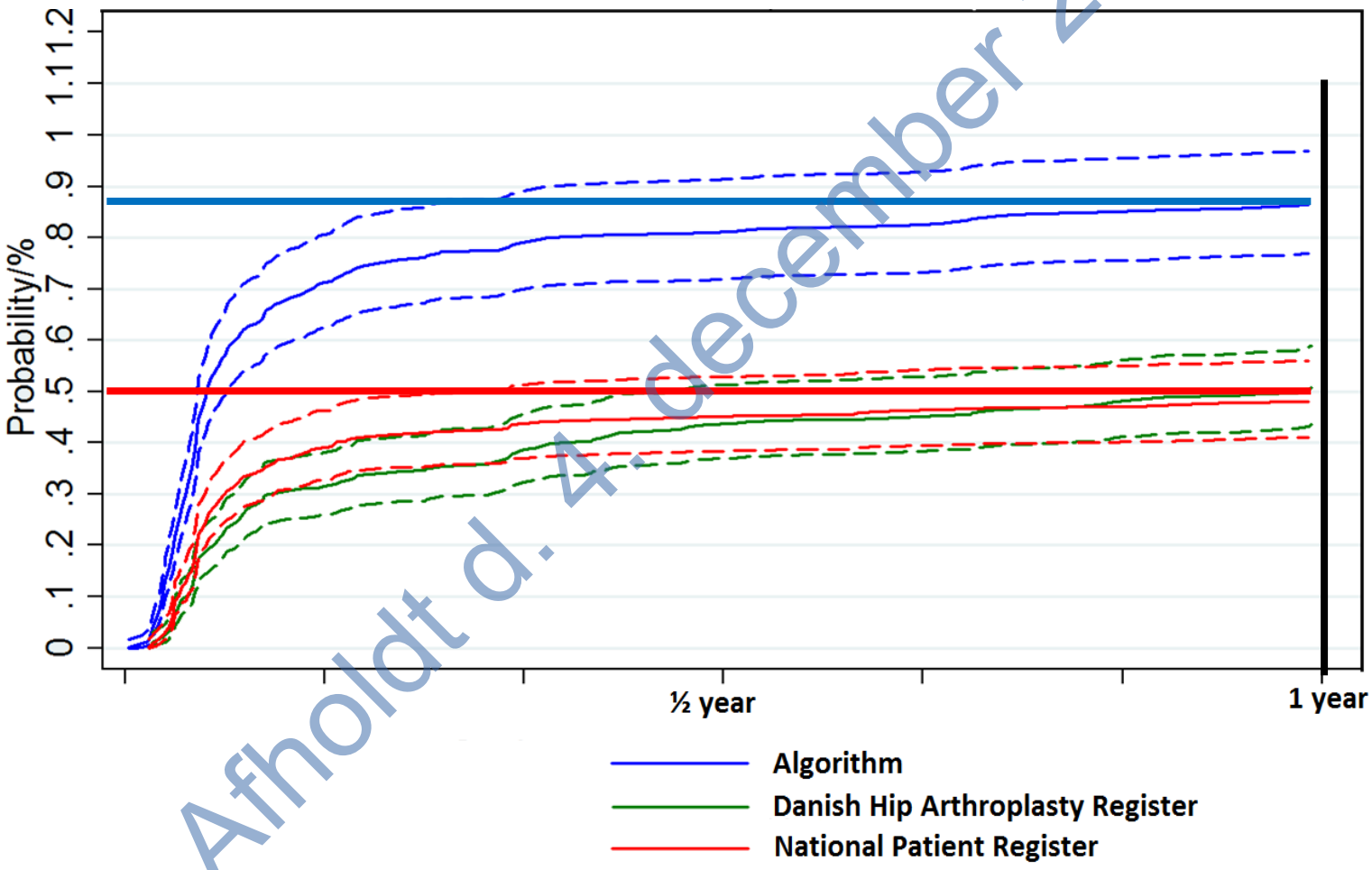


Figure 2. Algorithm for classification of the1,522 first-time revisions performed because of deep infection or other causes.

Cumulative Incidence of 1-year deep Infection
Danish Hip Arthroplasty Register



Cumulative Incidence of 1-year deep Infection
Danish Hip Arthroplasty Register



5-year Cumulative Incidence of Deep Infection

5-year follow-up	Nr. of primary THA	Nr. of Revisions	Cumulative Incidence
Danish Hip Arthroplasty Register	13175	84	0.64 [0.51; 0.79]
National Patient Register	13175	75	0.57 [0.45; 0.71]
Study	13172	136	1.03 [0.87; 1.22]

Cumulative Incidence of Deep Infection: study algortihm

1-year = 0.86 (0.77-0.97),
2-year = 0.96 (0.85-1.08)

THE BONE & JOINT JOURNAL

■ HIP

Validation of the diagnosis 'prosthetic joint infection' in the Danish Hip Arthroplasty Register

P. H. Gundtoft,
A. B. Pedersen,
H. C. Schønheyder,
S. Overgaard

From Odense University Hospital, Odense, Denmark

Aims

The purpose of this study was to validate the diagnosis of periprosthetic joint infection (PJI) in the Danish Hip Arthroplasty Register (DHR).

Patients and Methods

We identified a cohort of patients from the DHR who had undergone primary total hip arthroplasty (THA) since 1 January 2005 and followed them until first-time revision, death, emigration or until 31 December 2012.

Revision for PJI, as registered in the DHR, was validated against a benchmark which

***Bone Joint J* 2016;98-B:320–5.**

Algorithm; PJI

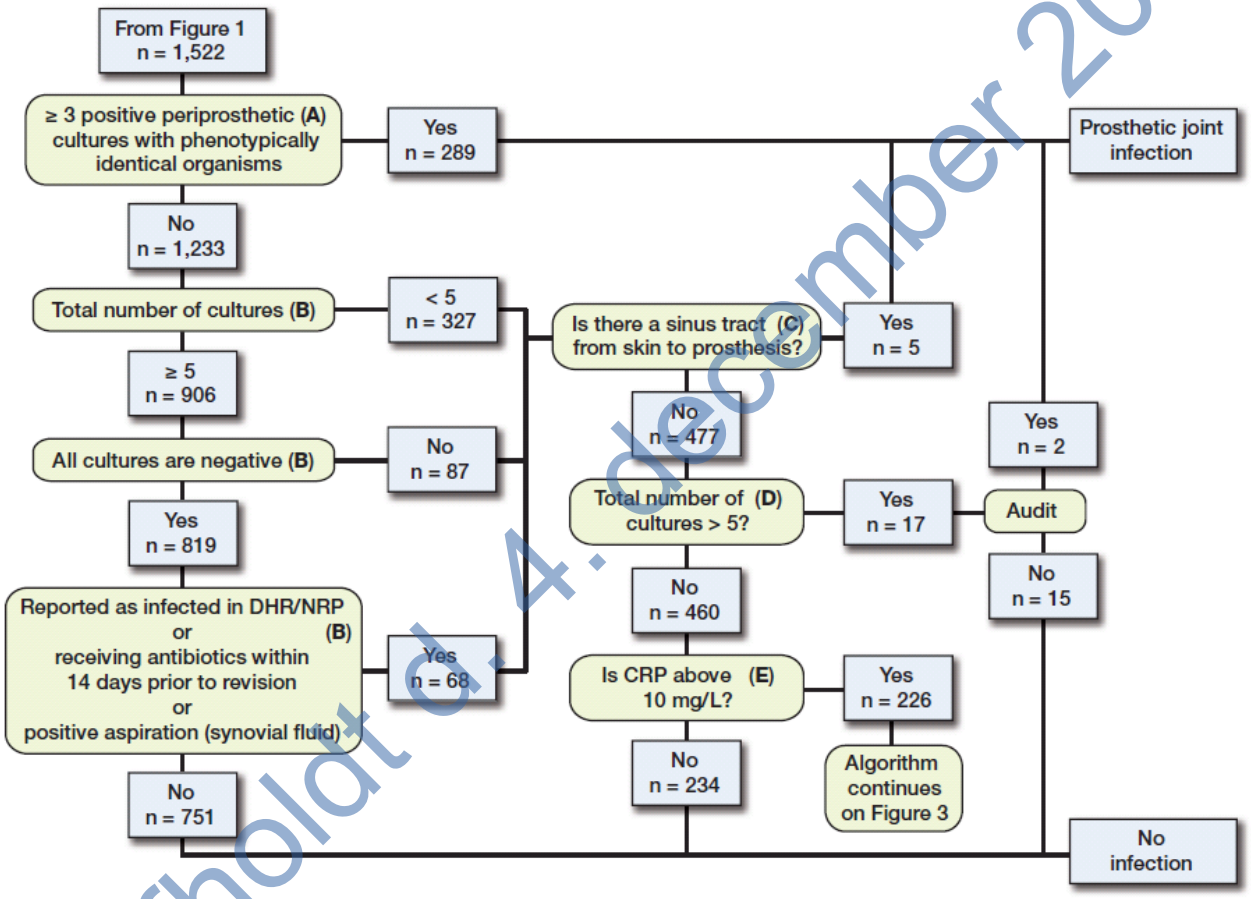


Figure 2. Algorithm for classification of the1,522 first-time revisions performed because of deep infection or other causes.

Validation study: Denmark

Danish Hip Arthroplasty Register

Sensitivity	66 %
Specificity	96 %

Sensitivity;the proportion of PJI which were correctly identified in the register
Specificity;the proportion of non-infected revisions, which were correctly identified

Validation study: Denmark

Danish Hip Arthroplasty Register

Linkage with microbiology databases

All orthopaedic departments in Denmark refer intra-operative taken samples to a department of clinical microbiology.

Results of culture are interred into a national database

Using the civil registration number as a patient identifier linkage can be done

Validation study: Linkage of databases

Danish Hip Arthroplasty Register

	Danish Hip Arthroplasty Register (DHR)	Linkage of DHR and Microbiology data
Sensitivity	66.1% [60 - 72]	93.1% [89-96]
Specificity	95.9% [95 - 97]	95.9% [95-97]

Conclusion

How accurate are registries in diagnosing infection?

- Arthroplasty Registers
  - Underestimate the incidence of PJI around 40%
  - Registered data might be biased
  - Accuracy can be improved by linkage of registers

Unexpected positive cultures in total hip arthroplasty revision increases re-revision risk

A national register study

N Milandt, PH Gundtoft, S Overgaard

Orthopaedic Research Unit
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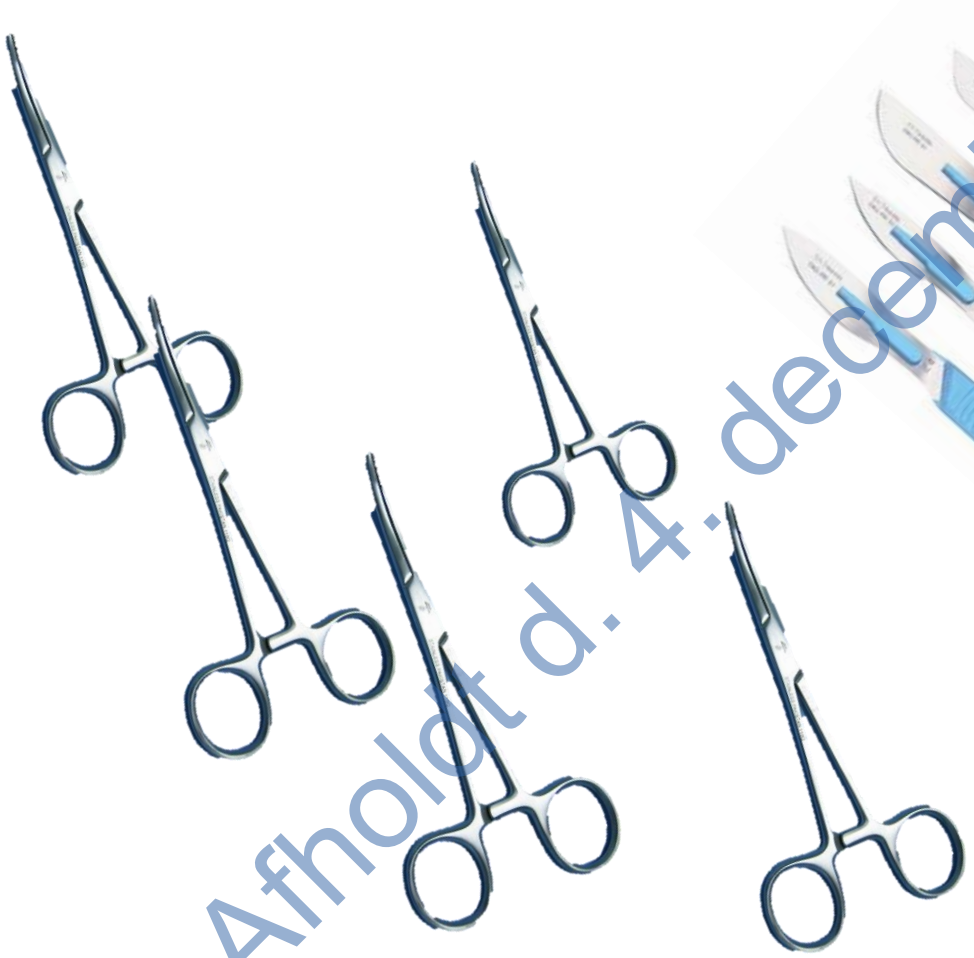
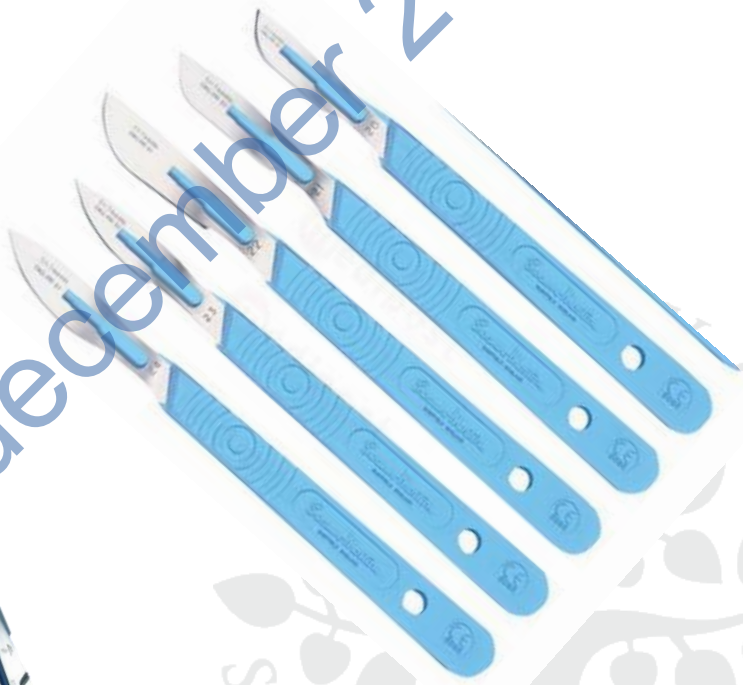
Odense University Hospital
Dept. of Clinical Research – University of Southern Denmark

5 biopsies





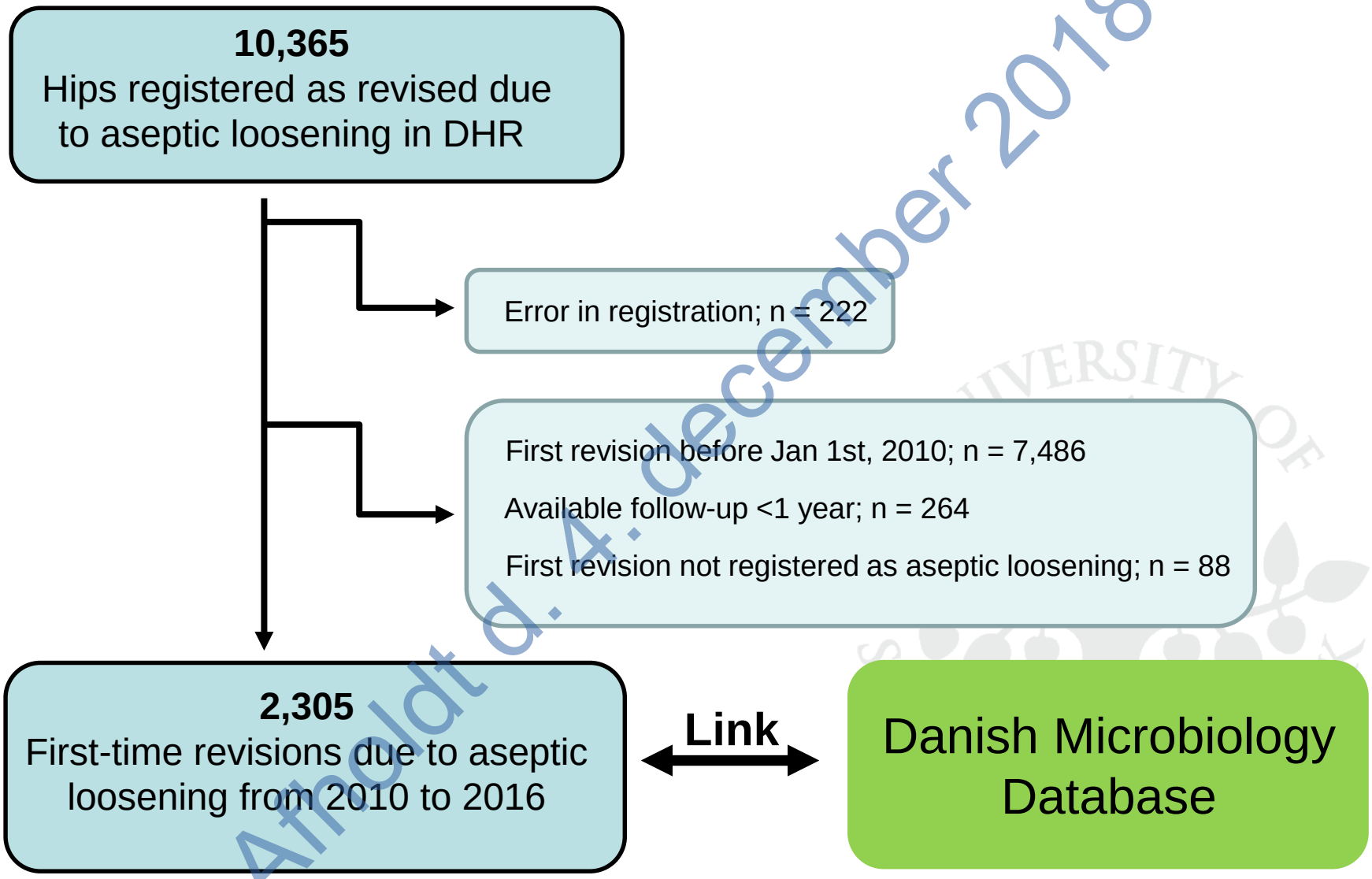
If unexpected positive cultures are present in clinically aseptic THA revision surgery

Is there an increased risk of re-revision?

Registries

- First-time aseptic loosening revisions from the **Danish Hip Arthroplasty Register (DHR)**

- Linked to culture results in the **Danish Microbiology Database**



3 groups

- 0 positive cultures
- 1 positive culture (including mixed growth)
- ≥2 positive cultures of the same bacteria

3 groups

- 0 positive cultures

- 1 positive culture (including mixed growth)

Sign of infection or sample contamination?

- ≥2 Positive cultures of the same bacteria

- Each case were followed for **1 year** in the registers

Outcomes : Relative risk

1. Re-revision due to all causes
2. Re-revision due to PJI

- Unexpected positive cultures in 282 cases (12%)
- 170 cases had 1 positive culture
- Coagulase-negative staphylococcus accounted for 121 cases (71%)

- Re-revision in 163 of all cases (7%)
  - 43 PJI (prosthetic joint infection) cases

- Increased risk of re-revision in cases with 1 positive culture
  - All-cause 1.73 (95% CI 1.07; 2.80)
  - PJI revision 2.63 (95% CI 1.16; 5.96)

Conclusion

Increased risk of re-revision within 1 year in **clinically aseptic revision cases** with **1 positive culture** in intraoperative tissue cultures

Clin Orthop Relat Res (2018) 00:1-10
DOI 10.1097/CORR.0000000000000609

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Selected Proceedings from the 7th Internation

A Single Positive Tissue Culture Increases the Risk of Rerevision of Clinically Aseptic THA: A National Register Study

Nikolaj R. Milandt MD, Per H. Gundtoft MD, PhD, Søren Overgaard MD, DMsc

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Clin Orthop Relat Res
DOI 10.1007/s11999-017-5289-6

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CLINICAL RESEARCH

Increased Mortality After Prosthetic Joint Infection in Primary THA

Per Hviid Gundtoft MD, PhD, Alma Becic Pedersen MD, PhD, DMSc,
Claus Varnum MD, PhD, Søren Overgaard MD, DMSc

Mortality following PJI: Results

- **First analysis: PJI vs. reference population**
  - Crude relative risk: 3.10 [2.33 - 4.13]
  - Adjusted relative risk: 2.18 [1.54 - 3.08]

- **Second analysis: PJI vs. aseptic revision**
  - Crude relative risk: 1.65 [1.15 - 2.40]
  - Adjusted relative risk: 1.87 [1.11 - 3.15]

Mortality following PJI: Results

Mortality risk for PJI revisions according to type of bacteria

	Nr. of PJI	Relative Risk	95 % Confidence Interval	*p*
Enterobacteriaceae	24	1.07	0.26; 4.45	0.92
Enterococcus spp	48	2.89	1.30; 6.40	0.01
Streptococcus spp	32	0.39	0.05; 3.02	0.37
Polymicrobial	76	0.98	0.37; 2.63	0.97
Other	33	1.26	0.32; 4.94	0.32

75 % of enterococcus infected revisions were treated with a Beta-lactam exclusively

Mortality following PJI: Conclusion

PJI within the first year of primary THA is associated with a 2-fold higher mortality

Especially if the patients are infected by enterococcus bacteria

Kvalitetsindikatorer

Ingen indikatorer med relevans for mikrobiologi og forebyggelse af infektion efter hoftealloplastik

Relevant

Pilot indikator
Frekvens dyb infektion efter primær indsættelse af total hoftealloplastik

- Reoperation indenfor 3 måneder i samme hofte efter primær hoftealloplastik grundet dyb infektion
- 3 patientgrupper: alle, frakturer og primær artrose

Proces:

- Nov 2016: diskussion styregruppe DHR

- DOS 2017: Møde med HAIBA
  DOS samt DSHK orienteret

- Efterfølgende flere møder: SO, SS, AH, PI, HC + HAIBA
  Definition af algoritme

- Fremlæggelse Kongres Dansk Ortopædisk Selskab 2018

Algoritme

Primær THA

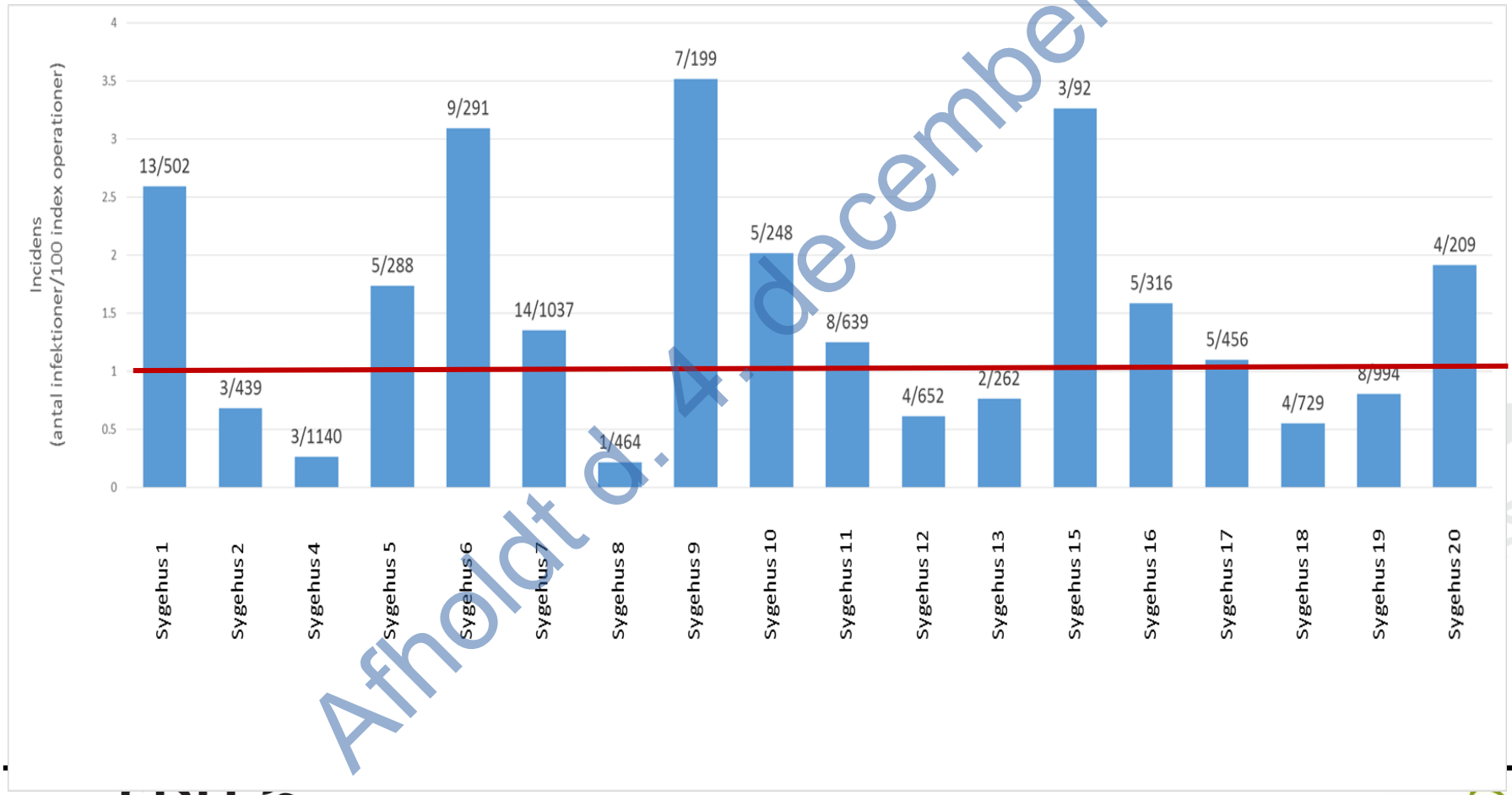
Revision indenfor 3-90 dage

2 eller *flere positive dyrkninger med samme bakterier

*mindst tre prøver

Incidens dyb infektion efter primær THA (%) Danmark, 2013-2018

Incidens dyb infektion efter primær THA (%) Danmark i 2017



Incidens dyb infektion efter primær THA (%) Danmark, på Sygehus 7, 2013-2018

Ny indikator
Frekvens dyb infektion efter primær indsættelse af total hoftealloplastik

- Reoperation indenfor 3 / 12 måneder i samme hofte efter primær hoftealloplastik grundet dyb infektion
- 3 patientgrupper: alle, frakturer og primær artrose

Proces: Mangler

- **Diverse tilladelser :**

  Sundhedsdatastyrelsen: DHR til HAIBA

  Mangler fra HAIBA til DHR

Thank you for your attention