The Danish Blood Donor Study and transfusion transmitted diseases

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Introduction - The Danish Blood Donor Study

Initiated in 2010

National multicenter public health study and biobank (plasma and DNA)

Questionnaires collected at inclusion

Permission to collect data from public registers
National Patient Register
  ICD-10 codes from all contacts with hospitals
National Prescription Register
  ATX codes from all filled prescriptions
Socioeconomic data

Permission to contact donor again

Access to recipient data through SCANDAT and national registers
Status

97,000 blood donors have been included
Current work dataset, merged and uploaded to Statistics Denmark:
81,898 participants
256,097 person-years of follow-up by Dec 31 2014
All baseline samples transferred to automated sample management system
>500,000 plasma archive samples from every donation available for research
New electronic, flexible questionnaire is being introduced
Research questions related to infection

• No DBDS substudy has yet addressed transfusion transmitted diseases

• Examples of substudies on donors and infection risk

• Demonstration of the statistical power when using diagnosis codes vs. filled prescriptions as the end point
Obesity and risk of infection

Obesity is associated with the metabolic syndrome, cardiovascular diseases, type 2 diabetes

Obesity is associated with surgical-site infections.

No studies on obesity related risk of all-cause infection among otherwise healthy individuals

Aim - To examine the association between obesity and risk of infection

Methods: 37,808 donors; 106,609 person-years
Results

1,233 participants had hospital contact due to for infection during 106,609 person-years of observation; adjusted for age, sex, smoking

<table>
<thead>
<tr>
<th>Site of infection</th>
<th>Women</th>
<th>Men</th>
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<tbody>
<tr>
<td>Infections overall</td>
<td>N=575, HR (95% CI)=1.44 (1.13-1.84), P=0.003</td>
<td>N=658, HR (95% CI)=1.53 (1.23-1.91), P&lt;0.0001</td>
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<tr>
<td>Abscesses</td>
<td>N=105, HR (95% CI)=2.28 (1.40-3.70), P=0.001</td>
<td>N=139, HR (95% CI)=2.33 (1.54-3.54), P&lt;0.0001</td>
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<tr>
<td>Infections of the skin and subcutaneous tissue</td>
<td>N=87, HR (95% CI)=0.85 (0.39-1.85), P=0.69</td>
<td>N=201, HR (95% CI)=2.24 (1.57-3.18), P&lt;0.0001</td>
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<tr>
<td>Respiratory tract infections</td>
<td>N=144, HR (95% CI)=1.60 (1.00-2.55), P=0.05</td>
<td>N=143, HR (95% CI)=1.27 (0.78-2.09), P=0.34</td>
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15,856 participants filled a prescription of antimicrobials during 58,834 person-years of observation.
Obesity – increased risk of infection

Obesity was associated with both hospitalization for infection and use of antimicrobials overall. Specifically:

• Abscesses (both sexes)
• Respiratory tract infections (women)
• Dicloxacillin/flucloxacillin (both sexes)
• Penicillin V (both sexes)

Could prescriptions serve as a feasible proxy for infectious donors?
Infections and the healthy donor effect

37,808 participants and 44,917 randomly chosen controls from the general population matched for age, sex, and region of Denmark.

22,198 donors received at least one prescription during 48,492 person-years.
Conclusion

• Incidence rate of at least one prescription among donors:
  Any prescription: 0.46 prescriptions/year
  Antimicrobials: 0.27 prescriptions/year

• Incidence of antimicrobial prescriptions only 15% lower among blood donors than non-donors

• Antimicrobial prescriptions within 2 weeks of donation => 1/88 donations

• New study: association between post-donation prescription and recipient risk of infection
DBDS and transfusion transmitted diseases

Imagine if an association had been found between neurodegenerative diseases in donors and recipients:

• Identification of agent in patients with disease
• Identification of donors with subsequent disease
• Locate and test sequential donor samples

Among 81,898 donors: 10 donors with ALS, 3 with PD, 1 with AD during 256,097 person-years
Donor microbiome and recipient outcome

• A nasal swab has been obtained from 2,050 donors; aim 10,000
• Primary aim: to study the associations of *S. aureus* colonisation with morbidity (infections, metabolic disorders, autoimmune diseases)
• Secondary aims:
  Nasal microbiome and donor morbidity
  *S. aureus/nasal microbiome and recipient outcome*
• First finding: *S. aureus* colonisation more prevalent than previous studies: 50%
• Fecal microbiome:
  Demand for donors for fecal transplantation
Blood donor study – research infrastructure

Research questions:
Blood donor health questions
Transfusion medicine questions
Generic health research questions

Infrastructure:
Donor and recipient database
National health registers
Questionnaire database
Biobank
Give blood, save lives, create knowledge

The Danish Blood Donor Study: now part of the strategy for the Danish Blood Donor Organisation to use in the recruitment and adherence of donors
The Danish Blood Donor Study

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