## Estimating the Overdiagnosis Fraction in Cancer Screening

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### Introduction

This software supports the mathematical investigation into estimating the fraction of cancers detected on screening that are overdiagnosed.

### References

Baker SG and Prorok PC. Overdiagnosis in cancer screening: Improved excess incidence estimation

**Requirement:**  Mathematica Version 11 or later

**To run the program**

|  |  |
| --- | --- |
| *copy* | all files into some folder called "FOLDER" |
| *start* | a new Mathematica session |
| *type* | SetDirectory["FOLDER"] |
| *type* | <<overdiag.m |
| *Estimate mean*  *Lead time* | MeanLeadTime[datavec,m,NewFitQ->True, MaxBoot->1000,Method->2]  where m is unassigned symbol |
| *To reproduce all*  *analyses* | Overdiag[{y,m},Fig->0,NewFitQ->True]  where y and m are unassigned symbols |
|  |  |

|  |  |
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### MeanLeadTime[data, m, options] where

| **Option** | **Default** | **Explanation** |
| --- | --- | --- |
| MaxBoot | 25 | Number of bootstrap iterations |
| NewFitQ | True | True (first fit) or False (later fit) |

**data**= {{n1,n2, n3, n4}, name,k0, z0, age},

|  |  |
| --- | --- |
| nj | Number of clinical cancers in time interval j after last screen. |
| name | Name of data set |
| k0 | Number of years between last screen and penultimate screen |
| z0 | Time interval length in years (usually 1 year) |

m is an unassigned symbol

**Downloads**

|  |  |
| --- | --- |
| overdiag.m | Main program to download (calls others) |
| overdiagsof.m | Data analyses for CNBSS and Norway data |
| overdiagleadtime.m | Mean lead time estimation |
| overdiagleadtimeboot.m | Mean lead time estimation bootstrap |
| overdiagleadtimecore.m | Core calculations for mean lead time estimatiom |
| overdiagsoftimeplot.m | Plot SOF and SIOF versus time |
| overdiagsoftimeplotcore.m | Core calculations for plots of SOF and SIOF versus time |
| overdiagsofmodelplot.m | Plot of SOFM and SIOFM versus mean lead time |
| overdiagsoftable.m | Tables of SOFM and SIOFM |
| overdiagsofstop.m | Stop screen analysis |
| overdiagsofcont.m | Continued screen analysis |
| overdiagsofpop.m | Population screen analysis |
| overdiagformula.m | Key formulas |

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