Recruitment methods employed in the National Lung Screening Trial (NLST)

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**NLST: The basics**

- Sponsored by the US National Cancer Institute (NCI)
- Joint venture of NCI's Division of Cancer Prevention and the American College of Radiology Imaging Network (ACRIN)
- RCT of lung cancer screening
  - Low radiation dose helical computed tomography versus single-view chest x-ray
  - Endpoint: lung cancer mortality
- Participants invited to receive 3 screens at annual intervals

**NLST: Participants**

- 53,454 participants; 33 screening centers
  - Enrollment: 2002-2004
  - Screening: 2002-2007
- Primary enrollment criteria
  - Ages 55-74 years
  - 30 pack-years of cigarette smoking history
    - Current and former (quit within 15 yrs)
- Randomization
  - Half received CT
  - Half received chest x-ray
Recruitment challenges in NLST

- NLST required enrollment of over 50,000 participants
- 33 screening centers; each responsible for choosing its own recruitment methods
- Recruitment of smokers (thought to be less compliant)

Measuring success of recruitment methods
Screening center participation

• Participating centers: 22 of the 33
  – All (10) LSS centers
  – 12 (of 22) ACRIN centers

• Participating centers enrolled almost 90% of participants

Data collection instrument

• Three-part questionnaire completed by the screening center coordinator
  – Subjectively assess the degree to which each specific method was used
  – Report, for each method:
    • Number of inquiries generated
    • Number of participants enrolled
    • Exact or approximate cost
    • For direct mail, asked also to report exact or approximate number of pieces mailed
  – Lessons learned
Qualitative measures

• Primary method of assessment was qualitative
  – Each screening center coordinator was asked to assign +’s or –’s to indicate
    the degree to which a method was used
    • +++ (extensive use); ++; +; - (tried but abandoned); blank (never tried)

• Three broad categories of recruitment
  – Direct mail (11 subcategories)
  – Community outreach (11 subcategories)
  – Mass media (8 subcategories)

Direct mail

• Mass mailings
  – Lists of names/addresses
  – Mail to large numbers of potential participants
    • Mail to many more than needed due to expected low response rate (interest and eligibility)
Community outreach

- Common approaches:
  - In-person seminars
    - Often conducted under the auspices of a religious or health organization
  - “Word-of-mouth” approach
    - Referrals by NLST participants
  - Health fairs

Mass media

- Newspapers
- TV
- Radio
- Internet sites
- Advertising in public places
- Newsletters
Quantitative methods

• Quantitative methods could not be used to assess recruitment success trial-wide
  – No standardized, trial-wide evaluation system
  – Most centers did not keep detailed data on source of each participant

• Quantitative data was available for a subset of centers
  – Direct mail – 12 centers
  – Community outreach – 7 centers
  – Mass media – 9 centers

Quantitative methods

– Direct mail
  • Response rate (# inquiries generated/# letters mailed)
  • Enrollment yield (# enrolled/# letters mailed)

– Direct mail, community outreach, mass media
  • Number enrolled
  • Cost per enrollee
Qualitative measures - results

Direct mail

• Utilized successfully by every screening center in varying degrees

• Most widely-used sources:
  – Commercial mailing lists – 18 centers (16 ‘+++’)
  – American Cancer Society lists (4 ‘+++’; 6 ‘++’)
  – Department of Motor Vehicles lists (4 ‘+++’)
Community outreach

• Successful methods used
  – Referrals by NLST participants/word of mouth (17 of 22 centers; 3 ‘+++’; 6 ‘++’)
  – Enrollment seminars (6 ‘+++’)

• Useful in recruiting Hispanic and African-American participants
  – Enrollment seminars (1 ‘+++’), church-based (1 ‘+++’)

Mass media

• Some form of mass media used by 8 of the 10 screening centers

• Very successful for ACRIN
  – Newspapers (9 ‘+++’; 1 ‘++’)
  – Radio (5 ‘+++’; 7 ‘++’)
  – TV (5 ‘+++’; 2 ‘++’)

Quantitative measures - results

Direct mail
(12 centers)

- Response rate: 0.3%-2.4%
- Enrollment rate: 0.2%-3.7%
- Cost per enrollee:
  - Range: $6-$325
  - Mean: $117
- Enrollment: 19,000 participants
<table>
<thead>
<tr>
<th>Community outreach</th>
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<tbody>
<tr>
<td>(7 centers)</td>
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<tr>
<td>• Cost per enrollee:</td>
</tr>
<tr>
<td>– Range: free - $25</td>
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<tr>
<td>– Mean: $21</td>
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<tr>
<td>• Enrollment: 1,000 participants</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Mass media</th>
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</thead>
<tbody>
<tr>
<td>(9 centers)</td>
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<tr>
<td>• Cost per enrollee:</td>
</tr>
<tr>
<td>– Range: free - $1,953</td>
</tr>
<tr>
<td>– Mean: $335</td>
</tr>
<tr>
<td>• Enrollment: 4,200 participants</td>
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</tbody>
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Limitations and strengths

Limitations

• Most results are not quantitative
  – Subjective impressions

• Meanings of ‘+’ and ‘-’ ratings may differ across centers

• Quantitative results available only for a subset of centers
Strengths

• Provides information on successful (and not so successful) strategies for recruitment of large numbers of trial participants

• Results are probably generalizable to other studies of primary and secondary prevention of chronic diseases among smokers

Thank you