**Supplemental Figure 1.** Overall survival of patients with an invasive recurrence after DCIS
**Supplemental Table 1.** Comparison of invasive recurrence characteristics between patients who did and did not receive endocrine therapy

*Missing data on receipt of endocrine therapy for 29 (6%) of patients

**Unknown categories are not considered in p-value calculation

|                  | Endocrine* therapy (n = 85) | No endocrine therapy (n = 338) | p-value** |
|------------------|-----------------------------|--------------------------------|-----------|
| **ER status**    |                             |                                |           |
| Positive         | 15 (19%)                    | 59 (18%)                       | 0.9       |
| Negative         | 65 (81%)                    | 271 (82%)                      |           |
| Unknown**        | 5                            | 8                               |           |
| **Histology**    |                             |                                |           |
| Ductal           | 67 (91%)                    | 247 (84%)                      | 0.5       |
| Lobular          | 4 (5%)                      | 24 (8%)                        |           |
| Other            | 3 (4%)                      | 22 (8%)                        |           |
| Unknown**        | 11                           | 45                              |           |
| **Nuclear grade**|                             |                                |           |
| High             | 34 (46%)                    | 121 (46%)                      | 0.5       |
| Intermediate     | 38 (51%)                    | 127 (48%)                      |           |
| Low              | 2 (3%)                      | 17 (6%)                        |           |
| Unknown**        | 11                           | 73                              |           |
**Supplemental Table 2.** Patterns of invasive recurrence after treatment of DCIS among patients treated with BCS and radiation vs. mastectomy

*Missing data for date of diagnosis of distant recurrence in BCS + radiation group*

| Presentation of invasive recurrence | BCS + radiation (n = 201) | Mastectomy (n = 85) | p-value |
|------------------------------------|---------------------------|---------------------|---------|
| Isolated local                     | 181 (90%)                 | 10 (12%)            | <0.001  |
| Local and regional                 | 1 (<1%)                   | 5 (6%)              |         |
| Local and distant                  | 8 (4%)                    | 0 (0%)              |         |
| Local, regional and distant        | 2 (1%)                    | 1 (1%)              |         |
| Isolated regional                  | 1 (<1%)                   | 48 (56%)            |         |
| Regional and distant               | 4 (2%)                    | 11 (13%)            |         |
| Isolated distant                   | 4 (2%)                    | 10 (12%)            |         |

**Median crude time to invasive recurrence, years**

|                        | BCS + radiation (n = 201) | Mastectomy (n = 85) | p-value |
|------------------------|---------------------------|---------------------|---------|
| All recurrences        | 6.3                       | 5.5                 | 0.24    |
| Any local              | 7.0                       | 7.4                 | 0.63    |
| Any regional           | 5.9                       | 5.3                 | 0.05    |
| Any distant*           | -                         | 5.9                 | n/a     |
**Supplemental Table 3.** Comparison of pathologic T stage and nuclear grade of the invasive recurrence between patients originally treated with mastectomy with and without DCIS noted in the recurrence specimen

*Missing data on DCIS in recurrence for 108 (24%) of patients
**Unknown categories are not considered in p-value calculation

| Pathologic T stage | DCIS in recurrence specimen* (n = 19) | No DCIS in recurrence specimen (n = 66) | p-value** |
|--------------------|--------------------------------------|---------------------------------------|-----------|
| T1                 | 6 (35%)                              | 7 (16%)                               | 0.3       |
| T2                 | 0 (0)                                | 2 (4.7%)                              |           |
| T3                 | 0 (0)                                | 0 (0)                                 |           |
| T4                 | 10 (59%)                             | 25 (58%)                              |           |
| Tx                 | 1 (5.9%)                             | 9 (21%)                               |           |
| Unknown**          | 2                                    | 23                                    |           |
| **Nuclear grade**  |                                      |                                       |           |
| High               | 11 (69%)                             | 18 (72%)                              | 0.8       |
| Intermediate       | 5 (31%)                              | 6 (24%)                               |           |
| Low                | 0 (0)                                | 1 (4%)                                |           |
| Unknown**          | 3                                    | 41                                    |           |