Supplementary Figure S1. Patient flow chart

Patients diagnosed with advanced breast cancer in 2007-2018
N=2854

Objective 1:
- Biopsy rate

Excluding patients with:
- Incomplete receptor subtype of metastatic disease, N=1712
- Incomplete receptor subtype of primary breast tumour, N=362
- Two primary tumours with different subtype, N=32

Patients with known subtype of primary and metastatic lesion
N=748

Objective 2:
- Discordance rate

Objective 3:
- Initial treatment choices following discordance
**Supplementary Table S1.** Change in estrogen receptor (ER), progesterone receptor (PR) and HER2 status between the primary breast cancer and a metastatic site, categorized by SONABRE total group (N=2854) and patients with known subtype of the primary and the metastatic site (N=748)

| Receptor status primary tumour | SONABRE Total group (N=2854) | SONABRE Known subtype of primary and metastatic site (N=748) |
|-------------------------------|-------------------------------|---------------------------------------------------|
|                               | N    | Discordance rate % (95% CI) | N    | Discordance rate % (95% CI) |
| ER total                      | 1215 | 11% (10%-13%)               | 748  | 11% (9%-14%)               |
| ER positive\(^a\)             | 1011 | 11% (9%-13%)               | 593  | 12% (10%-15%)              |
| ER negative                   | 204  | 15% (11%-21%)              | 155  | 8% (4%-13%)                |
| PR total                      | 1136 | 34% (31%-37%)              | 744\(^b\) | 34% (30%-37%) |
| PR positive                   | 746  | 45% (41%-48%)              | 447  | 47% (42%-51%)              |
| PR negative                   | 390  | 13% (10%-17%)              | 297  | 8% (5%-12%)                |
| HER2 total                    | 757  | 8% (7%-11%)                | 748  | 8% (7%-11%)                |
| HER2 positive                 | 610  | 25% (19%-33%)              | 144  | 26% (19%-33%)              |
| HER2 negative                 | 147  | 4% (3%-6%)                 | 604  | 4% (3%-6%)                 |

ER, Estrogen receptor; PR, progesterone receptor; HER2, Human Epidermal growth factor Receptor
\(^a\)10% threshold for ER and PR positivity
\(^b\)4 patients with missing PR-status
**Supplementary Table S2.** Subtype concordance and discordance rates between the primary and advanced breast cancer subtype

| Primary tumour subtype | Number of patients | Advanced breast cancer subtype | Discordance rate |
|------------------------|--------------------|--------------------------------|------------------|
|                        |                    | HR+/HER2-                      | HR+/HER2+        | HR-/HER2+       | TN               |                  |
|                        |                    | $N$ | $N$ (%) | $N$ (%) | $N$ (%) | $N$ (%) | % |
| **Total**              | 748                |                |            |            |            |            |  |
| HR+/HER2-              | 508                | 440 (87) | 20 (4)   | 2 (0.4)  | 46 (9)  | 13%       |
| HR+/HER2+              | 91                 | 24 (26)  | 41 (45)  | 19 (21)  | 7 (8)   | 55%       |
| HR-/HER2+              | 53                 | 1 (2)    | 2 (4)    | 45 (85)  | 5 (9)   | 15%       |
| TN                     | 96                 | 8 (8)    | 1 (1)    | 3 (3)    | 84 (88) | 12%       |
| **Recurrent disease**  | 624                |                |            |            |            |            |  |
| HR+/HER2-              | 423                | 361 (85)  | 16 (4)   | 2 (1)    | 44 (10) | 15%       |
| HR+/HER2+              | 76                 | 20 (26)  | 33 (43)  | 16 (21)  | 7 (9)   | 57%       |
| HR-/HER2+              | 41                 | 1 (2)    | 1 (2)    | 34 (83)  | 5 (12)  | 17%       |
| TN                     | 84                 | 7 (8)    | 1 (1)    | 3 (4)    | 73 (87) | 13%       |

HER2, Human Epidermal growth factor Receptor 2; HR, hormone receptor; TN, triple negative
**Supplementary Table S3. First-line treatment choice for concordant and discordant subtypes per primary tumour subtype**

| Primary tumour subtype | Subtype of metastatic site | Number of patients | Endocrine-based therapy n (%) | HER2-targeted therapy n (%) | Chemotherapy-based therapy n (%) | No systemic therapy n (%) |
|------------------------|-----------------------------|--------------------|-------------------------------|-----------------------------|-------------------------------|--------------------------|
| HR+/HER2-              | Concordant                   | 440                | 345 (78)                      | 0                           | 82 (19)                       | 13 (3)                   |
|                        | HR+/HER2+                   | 20                 | 8 (40)                        | 7 (35)                      | 4 (20)                        | 1 (5)                    |
|                        | HR-/HER2+                   | 2                  | 0                             | 1 (50)                      | 1 (50)                        | 0                        |
|                        | TN                          | 46                 | 7 (15)                        | 0                           | 36 (78)                       | 3 (7)                    |
| HR+/HER2+              | Concordant                   | 41                 | 6 (15)                        | 34 (83)                     | 1 (2)                         | 0                        |
|                        | HR+/HER2-                   | 24                 | 16 (67)                       | 0                           | 7 (29)                        | 1 (4)                    |
|                        | HR-/HER2+                   | 19                 | 0                             | 15 (79)                     | 2 (11)                        | 2 (11)                   |
|                        | TN                          | 7                  | 0                             | 2 (29)                      | 4 (57)                        | 1 (14)                   |
| HR-/HER2+              | Concordant                   | 45                 | 1 (2)                         | 30 (67)                     | 3 (7)                         | 11 (24)                  |
|                        | HR+/HER2-                   | 1                  | 0                             | 0                           | 1 (100)                       | 0                        |
|                        | HR+/HER2+                   | 2                  | 0                             | 2 (100)                     | 0                             | 0                        |
|                        | TN                          | 5                  | 0                             | 0                           | 4 (80)                        | 1 (14)                   |
| TN                     | Concordant                   | 84                 | 0                             | 2 (2)                       | 67 (80)                       | 15 (18)                  |
|                        | HR+/HER2-                   | 8                  | 2 (25)                        | 0                           | 6 (75)                        | 0                        |
|                        | HR+/HER2+                   | 1                  | 0                             | 1 (100)                     | 0                             | 0                        |
|                        | HR-/HER2+                   | 3                  | 0                             | 2 (67)                      | 0                             | 1 (33)                   |

HER2, Human Epidermal growth factor Receptor 2; HR, hormone receptor; TN, triple negative