# Viability Primary Screen IMPC_VIA_001

## Purpose

To assess the postnatal viability, sub-viability, and lethality of homozygous mice during cohort production.

## Experimental Design

- Monitor genotypes of Het X Het breeding units; score genotypes of at least 28 live pups, unless four or more hom pups are produced before this threshold is reached. (if other breeding strategies are used specify in the metadata and follow this convention HomXHet FemaleXMale)
- Definition of female age: "Female age earliest start/Female age oldest end" age of the youngest and oldest female mouse respectively when cohort breeding starts
- Age to be genotyped: P1-P28
- Record sex ratios of pups
- Collect and report all litters and genotype data: flag strains that produce no homozygote pups
- Identify and score lethals (defined as no homozygotes at genotype)
- Identify subviables (defined as <50% of expected homozygotes)
- If homozygous lethal: perform the embryonic lethal pipeline (if available)

## Procedure

1. Monitor pup number, genotypes and sex ratios of Het X Het intercrosses set to generate cohorts for phenotyping. Score at least 28 live pups when genotyped, unless four or more hom pups are produced before this threshold is reached.
2. Identify strains that produce no homozygous/hemizygous male or female pups.
   a. Strains that produce NO homozygous pups will be considered LETHAL (complete preweaning lethality [MP: 0011100]).
   b. X-linked strains that produce NO hemizygous male pups and NO female homozygous pups will be considered LETHAL (complete preweaning lethality [MP: 0011100]).
   c. These will undergo embryonic lethal pipeline (if available)
3. Identify strains that produce less than normal numbers of homozygous/hemizygous male or female pups.
   a. Strains that produce <50% expected (#totalpups * 0.125 (3 for 28) (4 for 29-36) (5 for 37-52) (See stats table in Notes)) homozygous pups will be considered SUBVIABLE (partial preweaning lethality [MP: 0011110]).
   b. X-linked strains that produce <50% expected (#total pups* 0.125 (3 for 28) (4 for 29-36) (5 for 37-52) (See stats table in Notes)) hemizygous male pups and female homozygous pups will be considered SUBVIABLE (partial preweaning lethality [MP: 0011110]).
   c. Some centers will proceed with secondary screening.
4. For lethal and subviable strains, heterozygous progeny will be sent for adult phenotyping.

# Notes

All genotypes should be collected using validated assays.
Line level calls will be rejected until 28 mice have been genotyped, unless four or more hom pups are produced before this threshold is reached, in which case a viable call is valid.

Sub-viable significance table:

| Number genotyped | Pups observed | Formula (Excel) | P-value |
|---|---|---|---|
| 28 | 3 | =BINOMDIST(3,28,0.25,1) | 0.055135567 |
| 29 | 4 | =BINOMDIST(4,29,0.25,1) | 0.115324345 |
| 30 | 4 | =BINOMDIST(4,30,0.25,1) | 0.0978696 |
| 31 | 4 | =BINOMDIST(4,31,0.25,1) | 0.082764531 |
| 32 | 4 | =BINOMDIST(4,32,0.25,1) | 0.069757389 |
| 33 | 4 | =BINOMDIST(4,33,0.25,1) | 0.05860841 |
| 34 | 4 | =BINOMDIST(4,34,0.25,1) | 0.049093333 |
| 35 | 4 | =BINOMDIST(4,35,0.25,1) | 0.041005517 |
| 36 | 4 | =BINOMDIST(4,36,0.25,1) | 0.034156964 |
| 37 | 5 | =BINOMDIST(5,37,0.25,1) | 0.071139152 |
| 38 | 5 | =BINOMDIST(5,38,0.25,1) | 0.060448988 |
| 39 | 5 | =BINOMDIST(5,39,0.25,1) | 0.051216574 |
| 40 | 5 | =BINOMDIST(5,40,0.25,1) | 0.043273983 |
| 41 | 5 | =BINOMDIST(5,41,0.25,1) | 0.036466047 |
| 42 | 5 | =BINOMDIST(5,42,0.25,1) | 0.030650935 |
| 43 | 5 | =BINOMDIST(5,43,0.25,1) | 0.025700232 |
| 44 | 5 | =BINOMDIST(5,44,0.25,1) | 0.021498648 |
| 45 | 5 | =BINOMDIST(5,45,0.25,1) | 0.017943462 |
| 46 | 5 | =BINOMDIST(5,46,0.25,1) | 0.014943774 |
| 47 | 5 | =BINOMDIST(5,47,0.25,1) | 0.012419646 |
| 48 | 5 | =BINOMDIST(5,48,0.25,1) | 0.010301181 |
| 49 | 5 | =BINOMDIST(5,49,0.25,1) | 0.008527583 |
| 50 | 5 | =BINOMDIST(5,50,0.25,1) | 0.007046225 |
| 51 | 5 | =BINOMDIST(5,51,0.25,1) | 0.005811761 |
| 52 | 5 | =BINOMDIST(5,52,0.25,1) | 0.004785276 |

# Parameters and Metadata

## Viability Outcome IMPC_VIA_001_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** true

**Options:** Homozygous - Viable, Homozygous - Lethal, Homozygous - Subviable, Hemizygous - Lethal, Hemizygous - Viable,

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## Additional Outcome IMPC_VIA_002_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** true

**Options:** Homozygous - Reduced Life Span, Homozygous - Sick Mouse,

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## Total pups IMPC_VIA_003_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

**Unit Measured:** count

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## Total pups WT IMPC_VIA_004_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

**Unit Measured:** count

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## Total pups heterozygous IMPC_VIA_005_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

**Unit Measured:** count

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## Total pups homozygous IMPC_VIA_006_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

**Unit Measured:** count

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## Total male WT IMPC_VIA_007_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

**Unit Measured:** count

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## Total male heterozygous IMPC_VIA_008_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

**Unit Measured:** count

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## Total male homozygous IMPC_VIA_009_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

**Unit Measured:** count

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## Total male pups IMPC_VIA_010_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

**Unit Measured:** count

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## Total female WT IMPC_VIA_011_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

**Unit Measured:** count

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## Total female heterozygous IMPC_VIA_012_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

**Unit Measured:** count

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## Total female homozygous IMPC_VIA_013_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

**Unit Measured:** count

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## Total female pups IMPC_VIA_014_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

**Unit Measured:** count

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## % pups WT IMPC_VIA_015_001 | v1.3

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** %

**Derivation:** div('IMPC_VIA_004_001', 'IMPC_VIA_003_001')

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## Free Comment IMPC_VIA_016_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

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## Average litter size IMPC_VIA_017_001 | v1.0

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

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## % pups heterozygous IMPC_VIA_018_001 | v1.2

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** %

**Derivation:** div('IMPC_VIA_005_001', 'IMPC_VIA_003_001')

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## % pups homozygous IMPC_VIA_019_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** %

**Derivation:** div('IMPC_VIA_006_001', 'IMPC_VIA_003_001')

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## % male WT IMPC_VIA_020_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** %

**Derivation:** div('IMPC_VIA_007_001', 'IMPC_VIA_010_001')

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## % male heterozygous IMPC_VIA_021_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** %

**Derivation:** div('IMPC_VIA_008_001', 'IMPC_VIA_010_001')

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## % male homozygous IMPC_VIA_022_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** %

**Derivation:** div('IMPC_VIA_009_001', 'IMPC_VIA_010_001')

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## % female WT IMPC_VIA_023_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** %

**Derivation:** div('IMPC_VIA_011_001', 'IMPC_VIA_014_001')

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## % female heterozygous IMPC_VIA_024_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** %

**Derivation:** div('IMPC_VIA_012_001', 'IMPC_VIA_014_001')

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## % female homozygous IMPC_VIA_025_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** %

**Derivation:** div('IMPC_VIA_013_001', 'IMPC_VIA_014_001')

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## Female age earliest start IMPC_VIA_026_001 | v1.1

procedureMetadata

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** Weeks

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## Female age oldest end IMPC_VIA_027_001 | v1.1

procedureMetadata

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Unit Measured:** Weeks

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## Time of dark cycle start IMPC_VIA_028_001 | v1.1

procedureMetadata

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

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## Time of dark cycle end IMPC_VIA_029_001 | v1.0

procedureMetadata

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

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## Age of pups at genotype IMPC_VIA_030_001 | v1.1

procedureMetadata

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

**Unit Measured:** Weeks

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## Breeding Strategy IMPC_VIA_031_001 | v1.0

procedureMetadata

**Req. Analysis:** false **Req. Upload:** true **Is Annotated:** false

**Options:** HetXHet, HetXHom, HomXHet, HetXHem, HetXWT,

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## P-value for outcome call IMPC_VIA_032_001 | v1.2

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Derivation:** unimplemented('')

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## Additional Subviable Outcome IMPC_VIA_033_001 | v1.1

simpleParameter

**Req. Analysis:** false **Req. Upload:** false **Is Annotated:** false

**Options:** Heterozygous - Subviable, Hemizygous - Subviable,

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