# MODELING AN INDIVIDUAL'S PROGRESSION OF COVID-19

Argonne
NATIONAL LABORATORY



**ASYMPTOMATIC**

**SUSCEPTIBLE**

**EXPOSED**
Infected but
not infectious

**EXPOSED TO
INFECTIOUS**

**PRESYMPTOMATIC**

**PRESYMPTOMATIC
TO SYMPTOMATIC**

**INFECTED**
Not hospitalized

**RECOVERED**

**INFECTED**
Not hospitalized

**DECEASED**

**INFECTED**
Pre-hospitalization

**SEVERE
INFECTION TO
HOSPITALIZATION**

**HOSPITALIZED**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-recovery

**HOSPITALIZED**
Pre-recovery

**CITYCOVID DISEASE PROGRESSION**
The progression of an individual along
the different pathways in the disease
progression diagram is determined by time
dependent and individual-specific factors,
including the age of the individual.

CityCOVID models people moving from
the susceptible to the exposed state
in the diagram according to the number
of contacts people have with infected
individuals over the course of their daily
schedules. Additional factors such as
age-dependent susceptibility and seasonal
transmissibility are also included.

**KEY**

Almost Certain: ≥ 99%

Very High Probability: 99-75%

High Probability: 74-50%

Low Probability: 49-25%

Very Low Probability: 25-1%

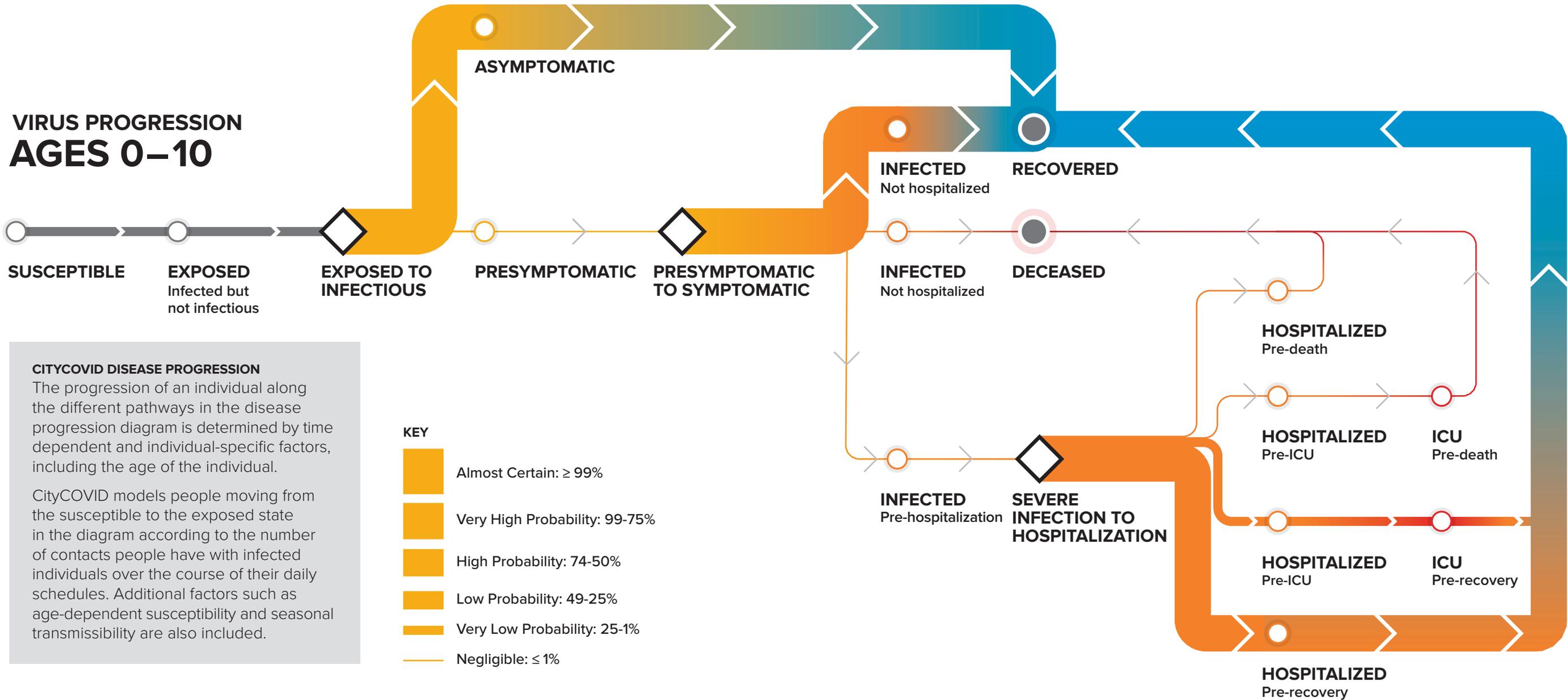Negligible: ≤ 1%

# MODELING AN INDIVIDUAL'S PROGRESSION OF COVID-19

Argonne
NATIONAL LABORATORY

## VIRUS PROGRESSION AGES 0–10

**ASYMPTOMATIC**

**SUSCEPTIBLE**

**EXPOSED**
Infected but not infectious

**EXPOSED TO INFECTIOUS**

**PRESYMPTOMATIC**

**PRESYMPTOMATIC TO SYMPTOMATIC**

**INFECTED**
Not hospitalized

**RECOVERED**

**INFECTED**
Not hospitalized

**DECEASED**

**INFECTED**
Pre-hospitalization

**SEVERE INFECTION TO HOSPITALIZATION**

**HOSPITALIZED**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-recovery

**HOSPITALIZED**
Pre-recovery

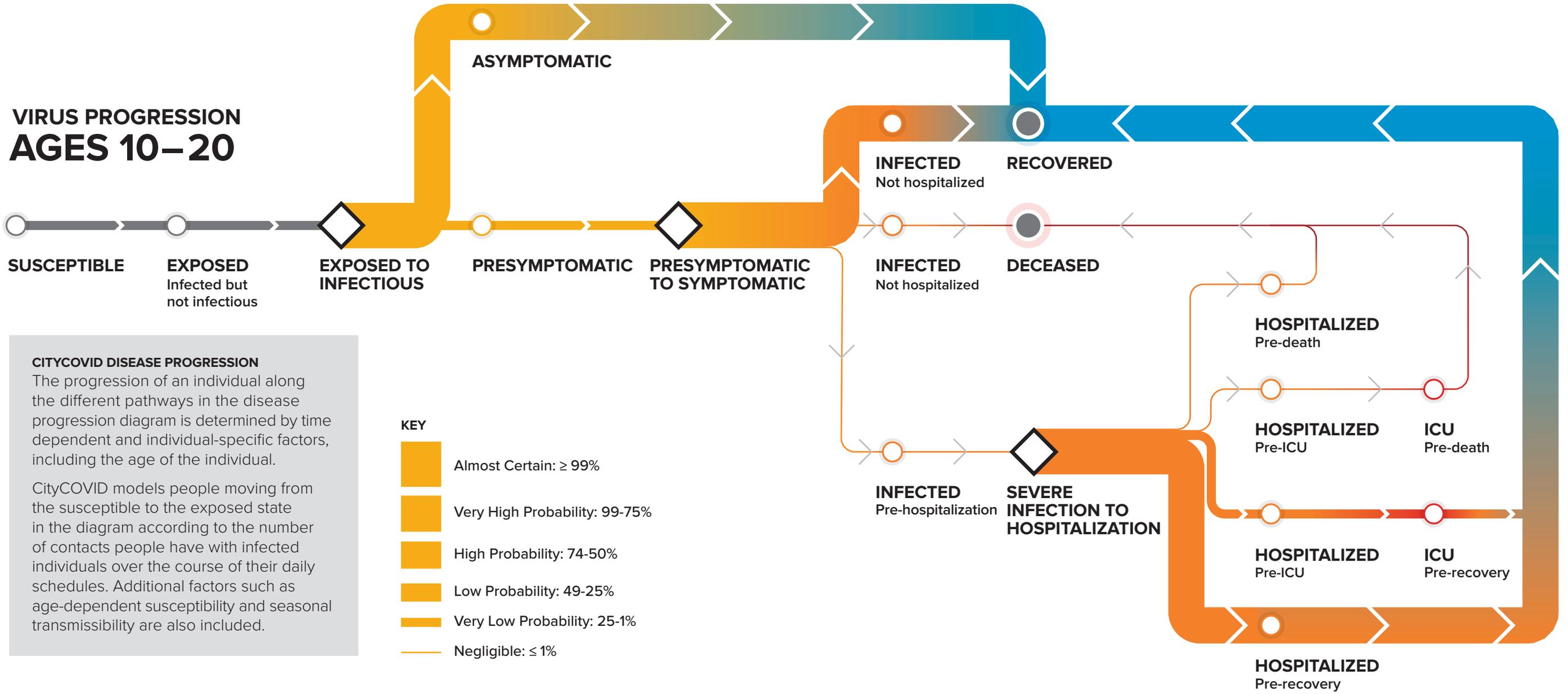**CITYCOVID DISEASE PROGRESSION**
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Very High Probability: 99-75%

High Probability: 74-50%

Low Probability: 49-25%

Very Low Probability: 25-1%

Negligible: ≤ 1%

# MODELING AN INDIVIDUAL'S PROGRESSION OF COVID-19

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**VIRUS PROGRESSION
AGES 10–20**

ASYMPTOMATIC

SUSCEPTIBLE

EXPOSED
Infected but
not infectious

EXPOSED TO
INFECTIOUS

PRESYMPTOMATIC

PRESYMPTOMATIC
TO SYMPTOMATIC

INFECTED
Not hospitalized

RECOVERED

INFECTED
Not hospitalized

DECEASED

INFECTED
Pre-hospitalization

SEVERE
INFECTION TO
HOSPITALIZATION

HOSPITALIZED
Pre-death

HOSPITALIZED
Pre-ICU

ICU
Pre-death

HOSPITALIZED
Pre-ICU

ICU
Pre-recovery

HOSPITALIZED
Pre-recovery

**CITYCOVID DISEASE PROGRESSION**
The progression of an individual along the different pathways in the disease progression diagram is determined by time dependent and individual-specific factors, including the age of the individual.

CityCOVID models people moving from the susceptible to the exposed state in the diagram according to the number of contacts people have with infected individuals over the course of their daily schedules. Additional factors such as age-dependent susceptibility and seasonal transmissibility are also included.

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High Probability: 74-50%

Low Probability: 49-25%

Very Low Probability: 25-1%

Negligible: ≤ 1%

# MODELING AN INDIVIDUAL'S PROGRESSION OF COVID-19

Argonne
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**VIRUS PROGRESSION**
# AGES 20−30

**SUSCEPTIBLE**

**EXPOSED**
Infected but not infectious

**EXPOSED TO INFECTIOUS**

**ASYMPTOMATIC**

**PRESYMPTOMATIC**

**PRESYMPTOMATIC TO SYMPTOMATIC**

**INFECTED**
Not hospitalized

**RECOVERED**

**INFECTED**
Not hospitalized

**DECEASED**

**INFECTED**
Pre-hospitalization

**SEVERE INFECTION TO HOSPITALIZATION**

**HOSPITALIZED**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-recovery
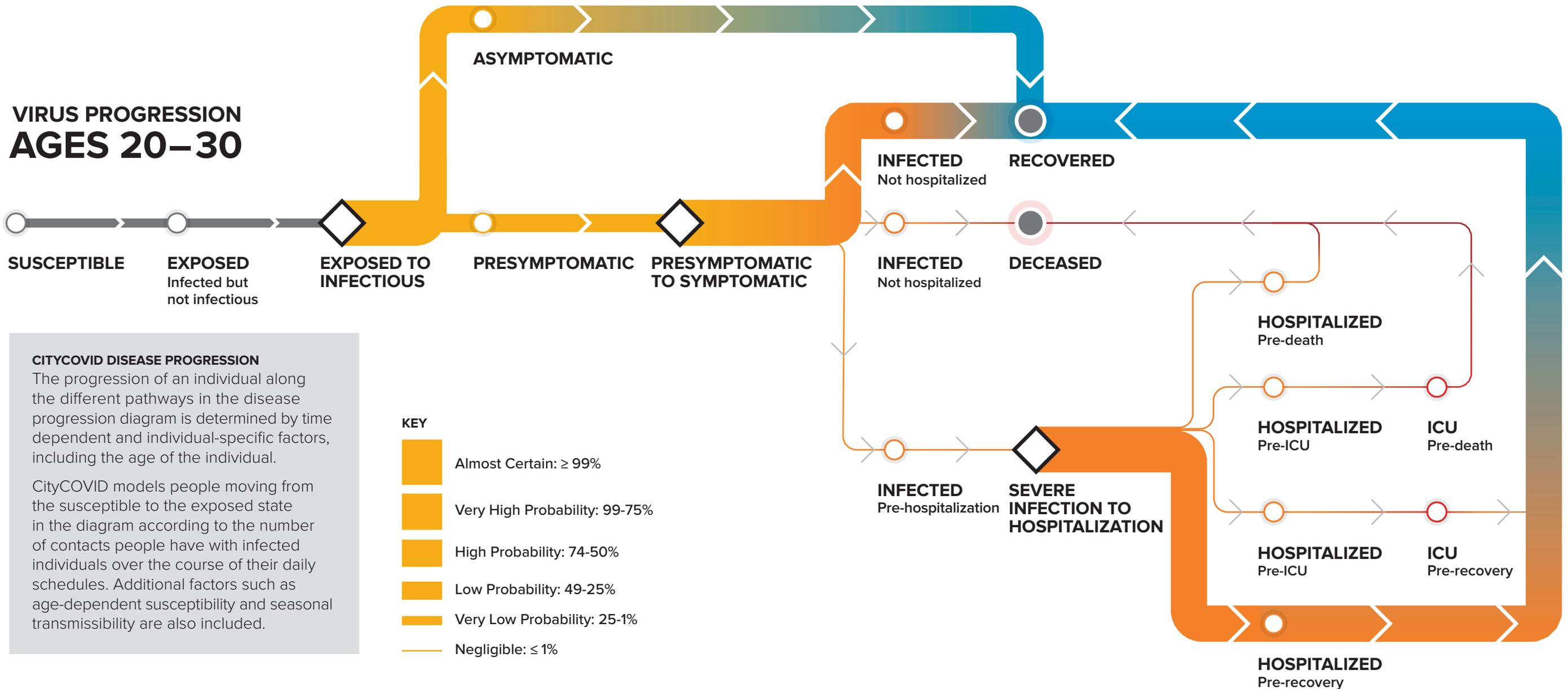
**HOSPITALIZED**
Pre-recovery

**CITYCOVID DISEASE PROGRESSION**
The progression of an individual along the different pathways in the disease progression diagram is determined by time dependent and individual-specific factors, including the age of the individual.

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High Probability: 74-50%

Low Probability: 49-25%

Very Low Probability: 25-1%

Negligible: ≤ 1%

# MODELING AN INDIVIDUAL'S PROGRESSION OF COVID-19

Argonne
NATIONAL LABORATORY



**VIRUS PROGRESSION**
## AGES 30–40

**ASYMPTOMATIC**

**SUSCEPTIBLE**

**EXPOSED**
Infected but not infectious

**EXPOSED TO INFECTIOUS**

**PRESYMPTOMATIC**

**PRESYMPTOMATIC TO SYMPTOMATIC**

**INFECTED**
Not hospitalized

**RECOVERED**

**INFECTED**
Not hospitalized

**DECEASED**

**INFECTED**
Pre-hospitalization

**SEVERE INFECTION TO HOSPITALIZATION**

**HOSPITALIZED**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-recovery

**HOSPITALIZED**
Pre-recovery

**CITYCOVID DISEASE PROGRESSION**
The progression of an individual along the different pathways in the disease progression diagram is determined by time dependent and individual-specific factors, including the age of the individual.
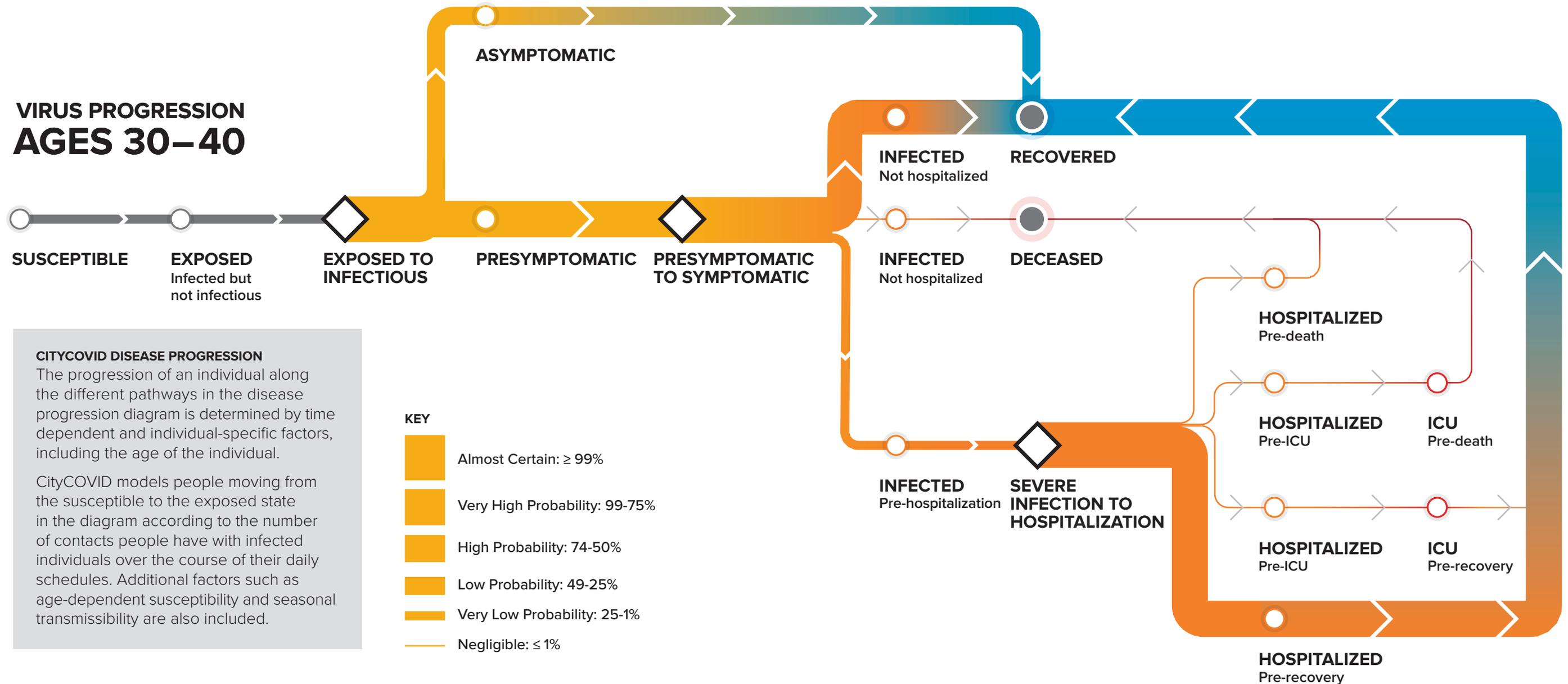
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**KEY**

Almost Certain: ≥ 99%

Very High Probability: 99-75%

High Probability: 74-50%

Low Probability: 49-25%

Very Low Probability: 25-1%

Negligible: ≤ 1%

# MODELING AN INDIVIDUAL'S PROGRESSION OF COVID-19

Argonne
NATIONAL LABORATORY



**VIRUS PROGRESSION AGES 40–50**

**ASYMPTOMATIC**

**SUSCEPTIBLE**

**EXPOSED**
Infected but not infectious

**EXPOSED TO INFECTIOUS**

**PRESYMPTOMATIC**

**PRESYMPTOMATIC TO SYMPTOMATIC**

**INFECTED**
Not hospitalized

**RECOVERED**

**INFECTED**
Not hospitalized

**DECEASED**

**INFECTED**
Pre-hospitalization

**SEVERE INFECTION TO HOSPITALIZATION**

**HOSPITALIZED**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-recovery

**HOSPITALIZED**
Pre-recovery
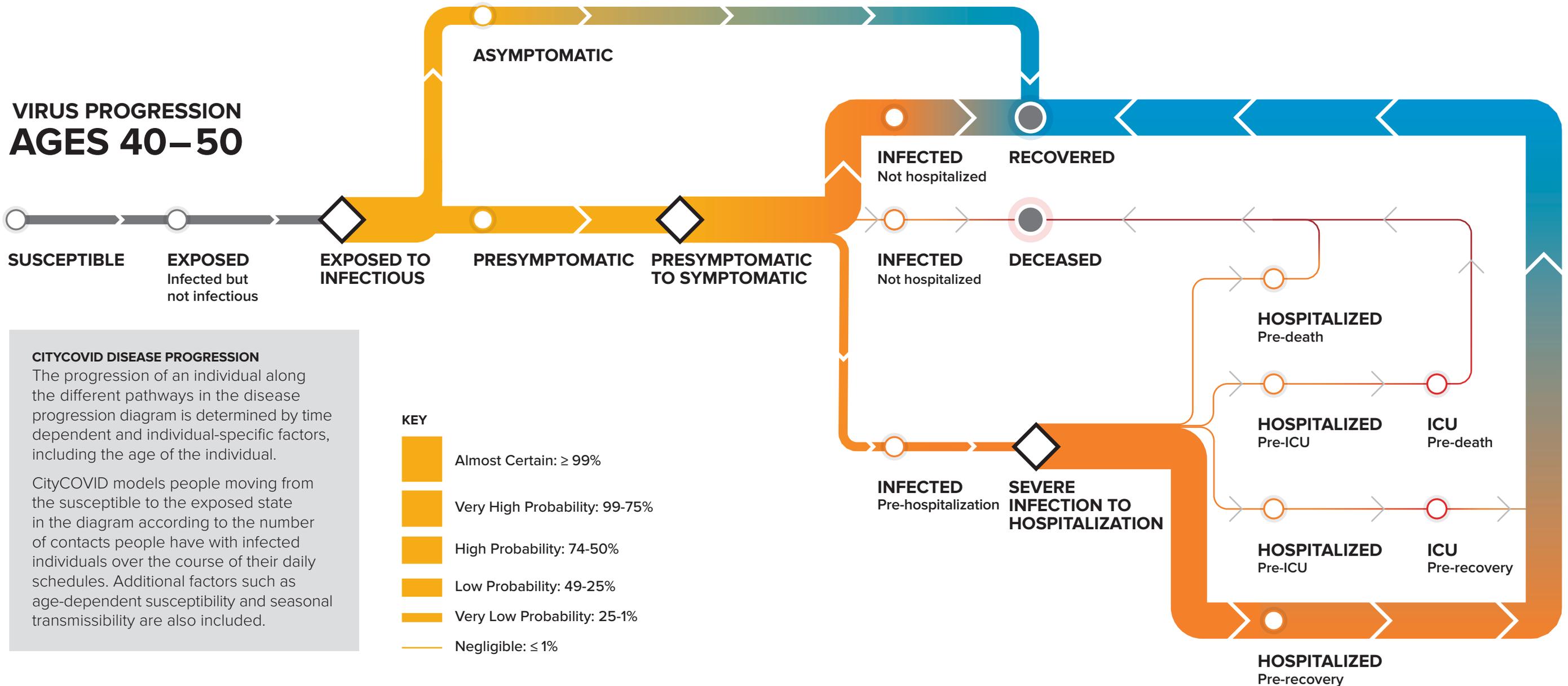
**CITYCOVID DISEASE PROGRESSION**
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**KEY**

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- Very High Probability: 99-75%
- High Probability: 74-50%
- Low Probability: 49-25%
- Very Low Probability: 25-1%
- Negligible: ≤ 1%

# MODELING AN INDIVIDUAL'S PROGRESSION OF COVID-19

Argonne
NATIONAL LABORATORY



**VIRUS PROGRESSION**
**AGES 50–60**

**ASYMPTOMATIC**

**SUSCEPTIBLE**

**EXPOSED**
Infected but not infectious

**EXPOSED TO INFECTIOUS**

**PRESYMPTOMATIC**

**PRESYMPTOMATIC TO SYMPTOMATIC**

**INFECTED**
Not hospitalized

**RECOVERED**

**INFECTED**
Not hospitalized

**DECEASED**

**INFECTED**
Pre-hospitalization

**SEVERE INFECTION TO HOSPITALIZATION**

**HOSPITALIZED**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-recovery

**HOSPITALIZED**
Pre-recovery

**CITYCOVID DISEASE PROGRESSION**
The progression of an individual along the different pathways in the disease progression diagram is determined by time dependent and individual-specific factors, including the age of the individual.

CityCOVID models people moving from the susceptible to the exposed state in the diagram according to the number of contacts people have with infected individuals over the course of their daily schedules. Additional factors such as age-dependent susceptibility and seasonal transmissibility are also included.

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Very High Probability: 99-75%

High Probability: 74-50%

Low Probability: 49-25%

Very Low Probability: 25-1%

Negligible: ≤ 1%

# MODELING AN INDIVIDUAL'S PROGRESSION OF COVID-19

Argonne
NATIONAL LABORATORY

**ASYMPTOMATIC**

**VIRUS PROGRESSION**
## AGES 60–70

**SUSCEPTIBLE**

**EXPOSED**
Infected but
not infectious

**EXPOSED TO INFECTIOUS**

**PRESYMPTOMATIC**

**PRESYMPTOMATIC TO SYMPTOMATIC**

**INFECTED**
Not hospitalized

**RECOVERED**

**INFECTED**
Not hospitalized

**DECEASED**

**INFECTED**
Pre-hospitalization

**SEVERE INFECTION TO HOSPITALIZATION**

**HOSPITALIZED**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-recovery

**HOSPITALIZED**
Pre-recovery

**CITYCOVID DISEASE PROGRESSION**
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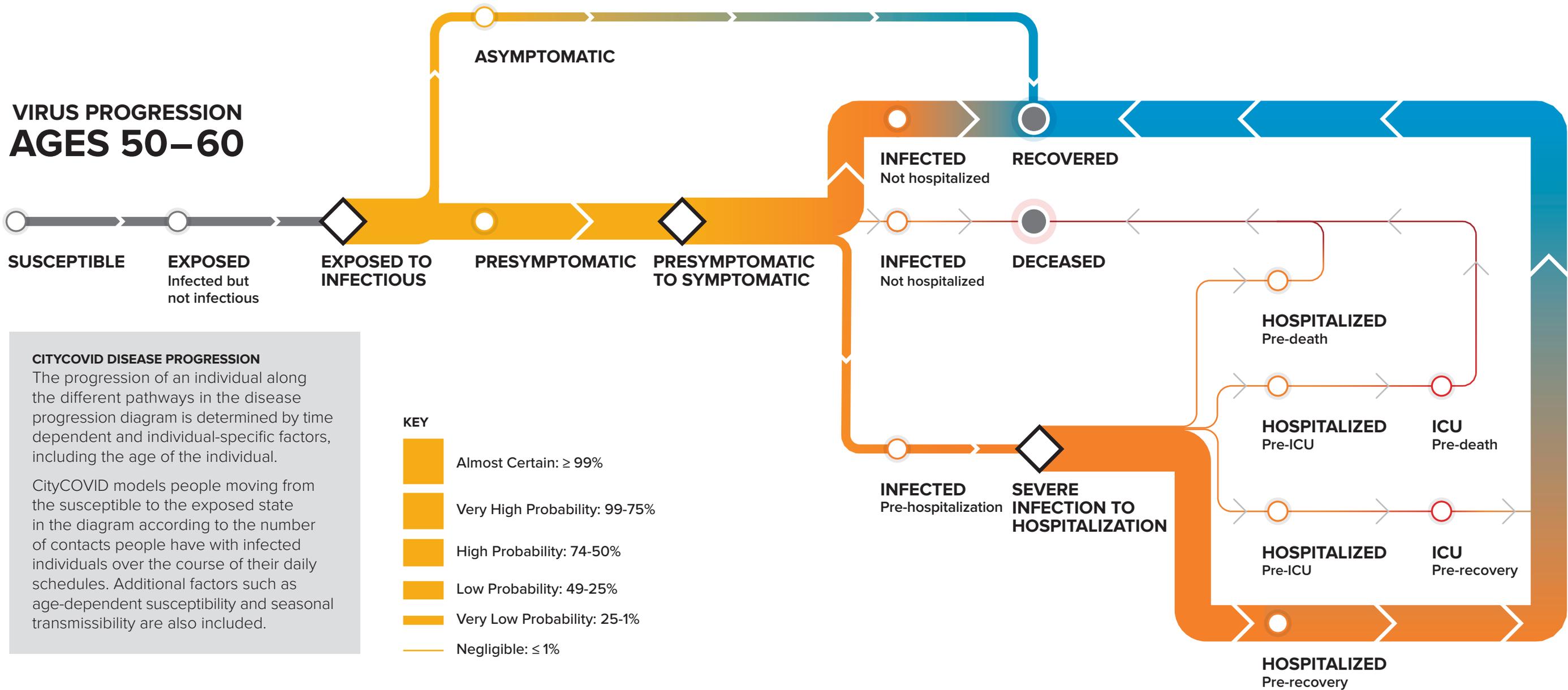transmissibility are also included.

**KEY**

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High Probability: 74-50%

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Very Low Probability: 25-1%

Negligible: ≤ 1%

# MODELING AN INDIVIDUAL'S PROGRESSION OF COVID-19

**VIRUS PROGRESSION**
# AGES 70−80

**ASYMPTOMATIC**

**SUSCEPTIBLE**

**EXPOSED**
Infected but
not infectious

**EXPOSED TO
INFECTIOUS**

**PRESYMPTOMATIC**

**PRESYMPTOMATIC
TO SYMPTOMATIC**

**INFECTED**
Not hospitalized

**RECOVERED**

**INFECTED**
Not hospitalized

**DECEASED**

**INFECTED**
Pre-hospitalization

**SEVERE
INFECTION TO
HOSPITALIZATION**

**HOSPITALIZED**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-recovery

**HOSPITALIZED**
Pre-recovery

**CITYCOVID DISEASE PROGRESSION**
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Negligible: ≤ 1%

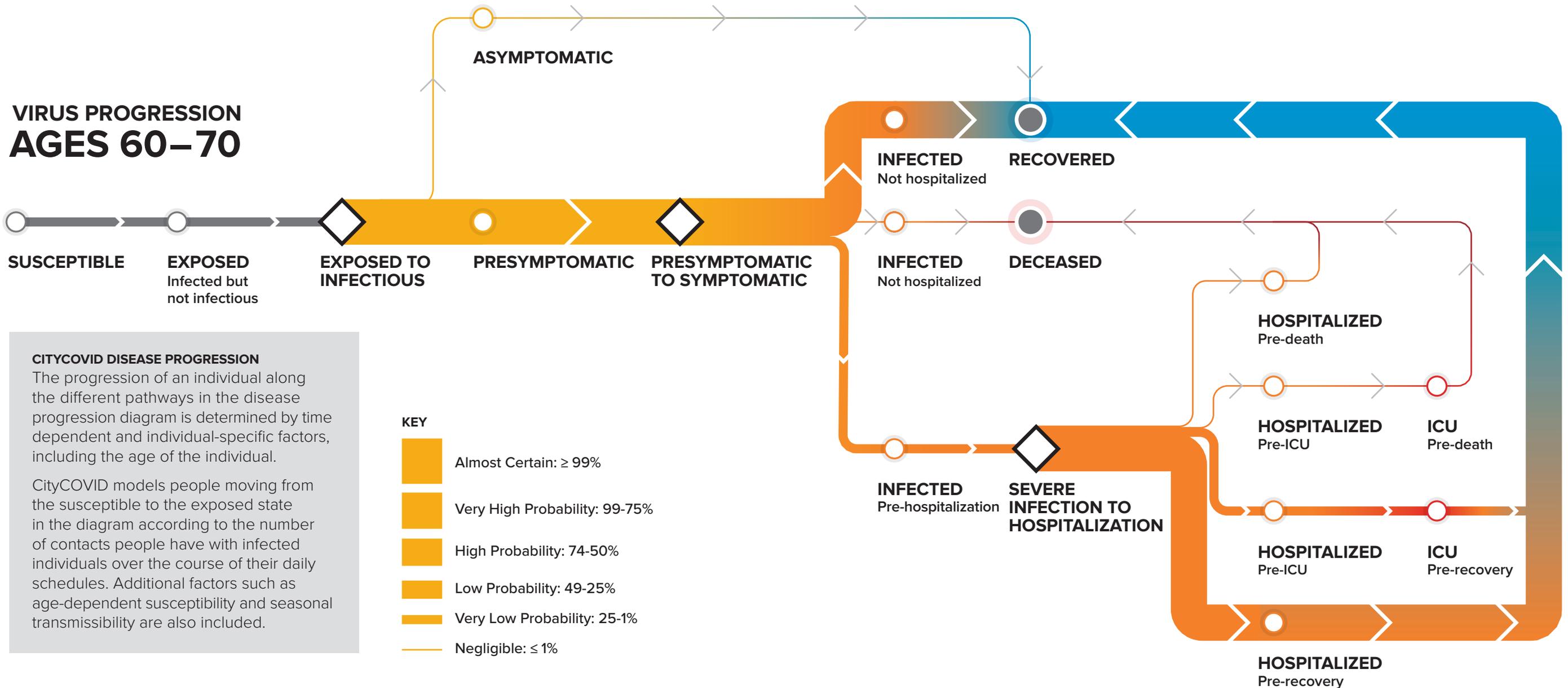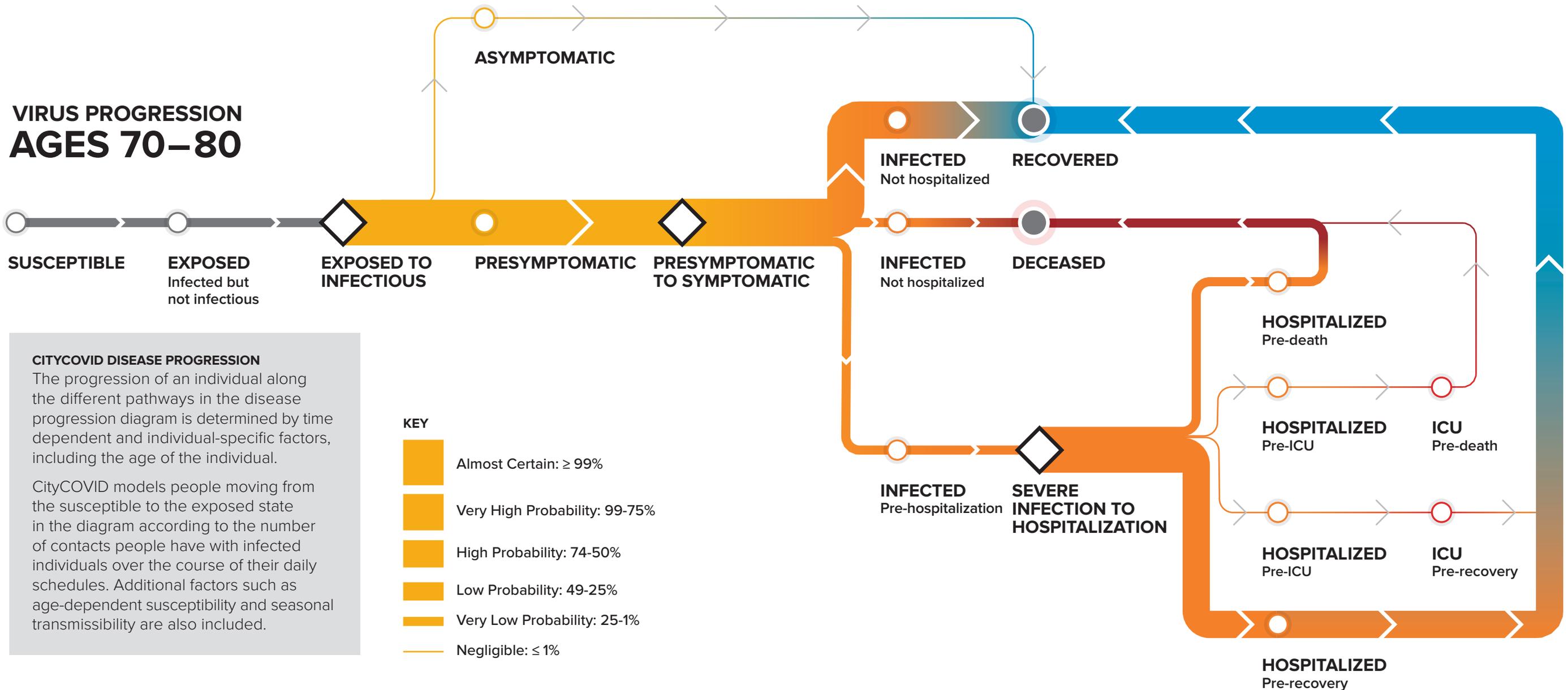# MODELING AN INDIVIDUAL'S PROGRESSION OF COVID-19

**ASYMPTOMATIC**

## VIRUS PROGRESSION
## AGES 80+

**SUSCEPTIBLE**

**EXPOSED**
Infected but
not infectious

**EXPOSED TO
INFECTIOUS**

**PRESYMPTOMATIC**

**PRESYMPTOMATIC
TO SYMPTOMATIC**

**INFECTED**
Not hospitalized

**RECOVERED**

**INFECTED**
Not hospitalized

**DECEASED**

**INFECTED**
Pre-hospitalization

**SEVERE
INFECTION TO
HOSPITALIZATION**

**HOSPITALIZED**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-death

**HOSPITALIZED**
Pre-ICU

**ICU**
Pre-recovery

**HOSPITALIZED**
Pre-recovery

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