

Patient Event History Analysis

Event Timeline for 10 Randomly Selected Patients

Single-Facility Analysis

2025-10-29

Table of contents

1	Introduction	2
2	Data Loading and Processing	2
3	Patient Summary	2
4	Event Timeline Visualization	4
5	Individual Patient Event Details	4
5.1	Patient 13231	4
5.2	Patient 13847	5
5.3	Patient 14547	5
5.4	Patient 14932	5
5.5	Patient 15168	6
5.6	Patient 15216	6
5.7	Patient 15691	6
5.8	Patient 16076	6
5.9	Patient 16996	7
5.10	Patient 18054	7
6	Event Statistics	7
7	Quartile Analysis by Event Count	8
7.1	Quartile Timeline Visualization	9
7.2	Quartile Patient Details	9
7.2.1	Patient 15856 (Q1 (Low))	9
7.2.2	Patient 15394 (Q1 (Low))	10
7.2.3	Patient 18627 (Q3 (Med-High))	10

7.2.4	Patient 16426 (Q3 (Med-High))	10
7.2.5	Patient 18146 (Q4 (High))	10
7.2.6	Patient 15412 (Q4 (High))	11
7.3	Quartile Comparison	11
8	Conclusions	12
8.1	Random Sample Analysis (10 patients)	12
8.2	Quartile Analysis (2 patients per quartile)	12
8.3	Methodological Insights	13

1 Introduction

This report presents a detailed event history analysis for 10 randomly selected patients from the single-facility simulation. The analysis combines data from multiple event files to create comprehensive timelines showing the sequence of events each patient experienced during their stay(s) at the facility.

2 Data Loading and Processing

Loading event data...

Data loaded successfully.

Admissions: 19006 events

Clinical detections: 1385 events

Surveillance detections: 1625 events

Decolonizations: 1821 events

Transmissions: 12408 events

Selected patients: 15168, 15216, 14932, 13231, 16996, 15691, 14547, 13847, 16076, 18054

Total patients in admissions: 19006

Total patients in discharged: 6470

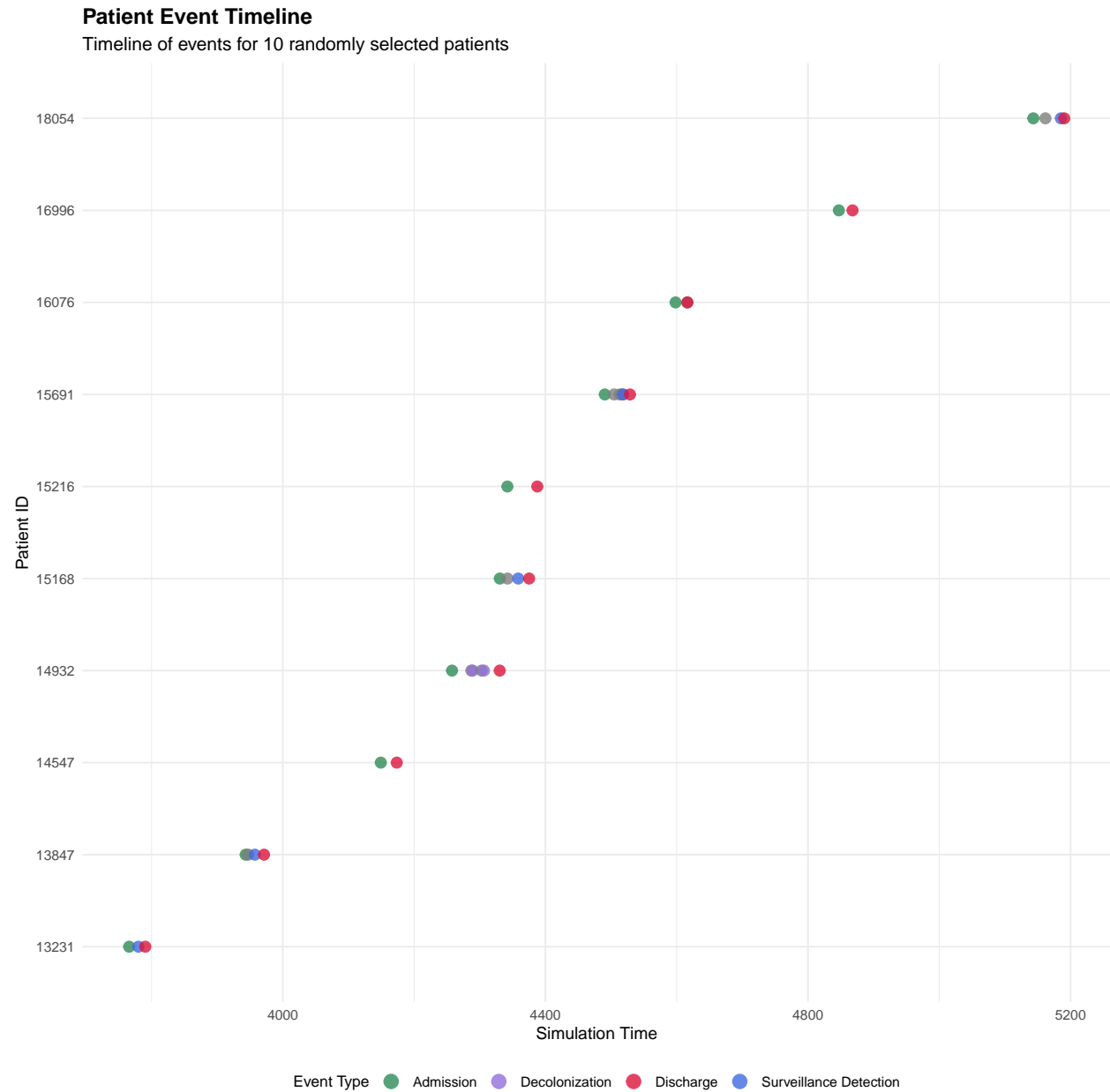
Common patients: 6370

3 Patient Summary

Table 1: Summary of Selected Patients

Patient ID	Admission Time	Discharge Time	Length of Stay	Colonized	Detected	Detection Count
13231	3765.86	3790.54	24.68	Yes	Yes	0
13847	3943.41	3971.38	27.97	Yes	Yes	0
14547	4149.27	4173.57	24.31	No	No	0
14932	4257.74	4330.41	72.67	No	No	0
15168	4330.54	4375.20	44.66	Yes	Yes	0
15216	4342.08	4387.63	45.55	No	No	0
15691	4490.47	4528.86	38.38	Yes	Yes	0
16076	4598.26	4616.49	18.23	Yes	No	0
16996	4847.04	4867.85	20.81	No	No	0
18054	5143.24	5190.42	47.18	Yes	Yes	0

4 Event Timeline Visualization



5 Individual Patient Event Details

5.1 Patient 13231

Patient Summary: - Admission Time: 3765.86 - Discharge Time: 3790.54 - Length of Stay: 24.68 days - Colonized: Yes - Detected: Yes - Detection Count: 0

Table 2: Event History for Patient 13231

Time	Event Type
3765.86	Admission
3779.86	Surveillance Detection
3790.54	Discharge

5.2 Patient 13847

Patient Summary: - Admission Time: 3943.41 - Discharge Time: 3971.38 - Length of Stay: 27.97 days - Colonized: Yes - Detected: Yes - Detection Count: 0

Table 3: Event History for Patient 13847

Time	Event Type
3943.41	Admission
3947.20	Transmission (Recipient)
3957.41	Surveillance Detection
3971.38	Discharge

5.3 Patient 14547

Patient Summary: - Admission Time: 4149.27 - Discharge Time: 4173.57 - Length of Stay: 24.31 days - Colonized: No - Detected: No - Detection Count: 0

Table 4: Event History for Patient 14547

Time	Event Type
4149.27	Admission
4173.57	Discharge

5.4 Patient 14932

Patient Summary: - Admission Time: 4257.74 - Discharge Time: 4330.41 - Length of Stay: 72.67 days - Colonized: No - Detected: No - Detection Count: 0

Table 5: Event History for Patient 14932

Time	Event Type
4257.74	Admission
4287.17	Transmission (Recipient)
4289.11	Decolonization
4302.74	Transmission (Recipient)
4306.38	Decolonization
4330.41	Discharge

5.5 Patient 15168

Patient Summary: - Admission Time: 4330.54 - Discharge Time: 4375.2 - Length of Stay: 44.66 days - Colonized: Yes - Detected: Yes - Detection Count: 0

Table 6: Event History for Patient 15168

Time	Event Type
4330.54	Admission
4342.24	Transmission (Source)
4358.54	Surveillance Detection
4375.20	Discharge

5.6 Patient 15216

Patient Summary: - Admission Time: 4342.08 - Discharge Time: 4387.63 - Length of Stay: 45.55 days - Colonized: No - Detected: No - Detection Count: 0

Table 7: Event History for Patient 15216

Time	Event Type
4342.08	Admission
4387.63	Discharge

5.7 Patient 15691

Patient Summary: - Admission Time: 4490.47 - Discharge Time: 4528.86 - Length of Stay: 38.38 days - Colonized: Yes - Detected: Yes - Detection Count: 0

Table 8: Event History for Patient 15691

Time	Event Type
4490.47	Admission
4504.55	Transmission (Recipient)
4513.13	Transmission (Source)
4517.10	Transmission (Source)
4518.47	Surveillance Detection
4528.86	Discharge

5.8 Patient 16076

Patient Summary: - Admission Time: 4598.26 - Discharge Time: 4616.49 - Length of Stay: 18.23 days - Colonized: Yes - Detected: No - Detection Count: 0

Table 9: Event History for Patient 16076

Time	Event Type
4598.26	Admission
4615.95	Transmission (Recipient)

Time	Event Type
4616.49	Discharge

5.9 Patient 16996

Patient Summary: - Admission Time: 4847.04 - Discharge Time: 4867.85 - Length of Stay: 20.81 days - Colonized: No - Detected: No - Detection Count: 0

Table 10: Event History for Patient 16996

Time	Event Type
4847.04	Admission
4867.85	Discharge

5.10 Patient 18054

Patient Summary: - Admission Time: 5143.24 - Discharge Time: 5190.42 - Length of Stay: 47.18 days - Colonized: Yes - Detected: Yes - Detection Count: 0

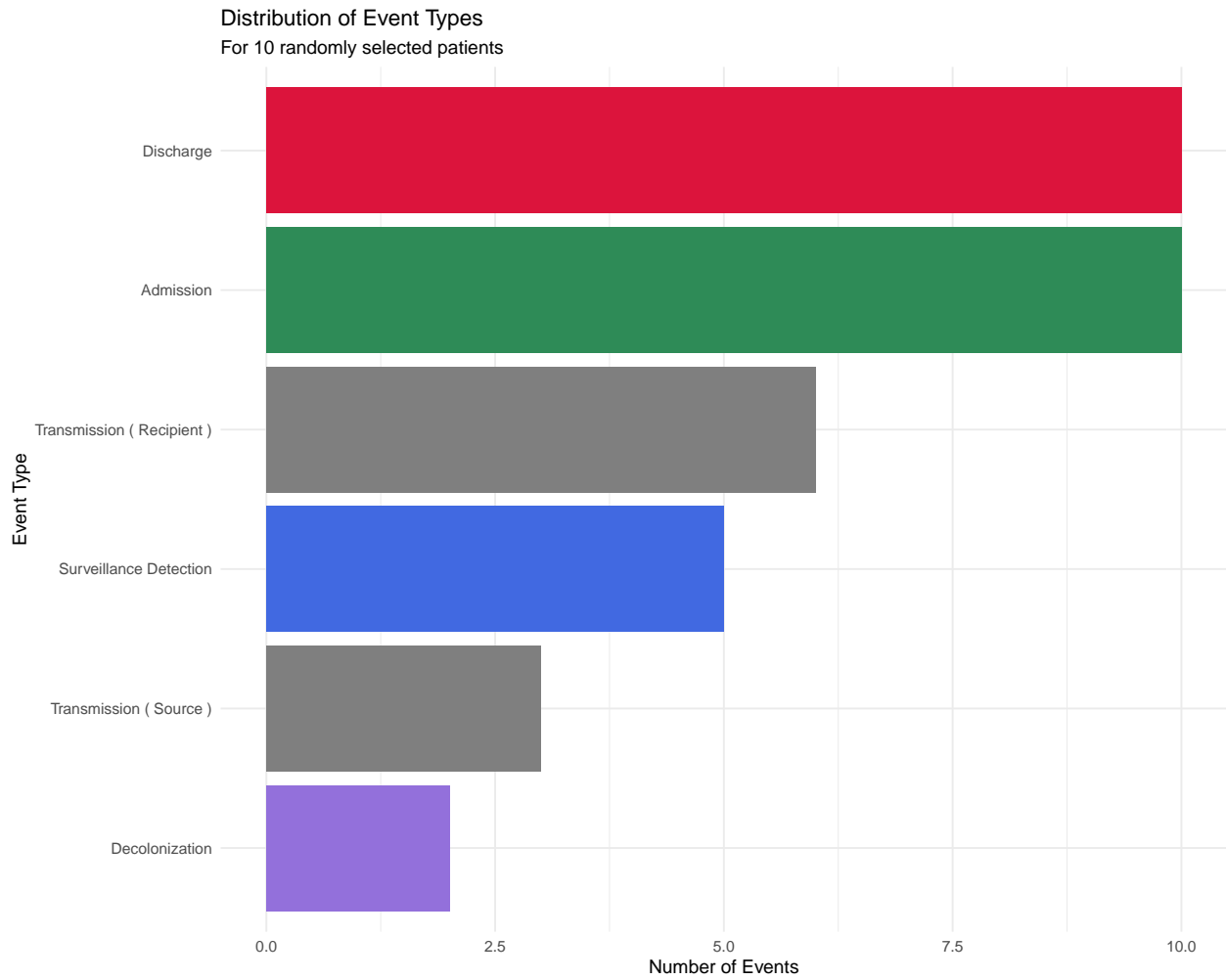
Table 11: Event History for Patient 18054

Time	Event Type
5143.24	Admission
5161.72	Transmission (Recipient)
5185.24	Surveillance Detection
5190.42	Discharge

6 Event Statistics

Table 12: Event Statistics for Selected Patients

Event Type	Total Events	Unique Patients
Admission	10	10
Discharge	10	10
Transmission (Recipient)	6	5
Surveillance Detection	5	5
Transmission (Source)	3	2
Decolonization	2	1



7 Quartile Analysis by Event Count

Table 13: Event Count Distribution by Quartile

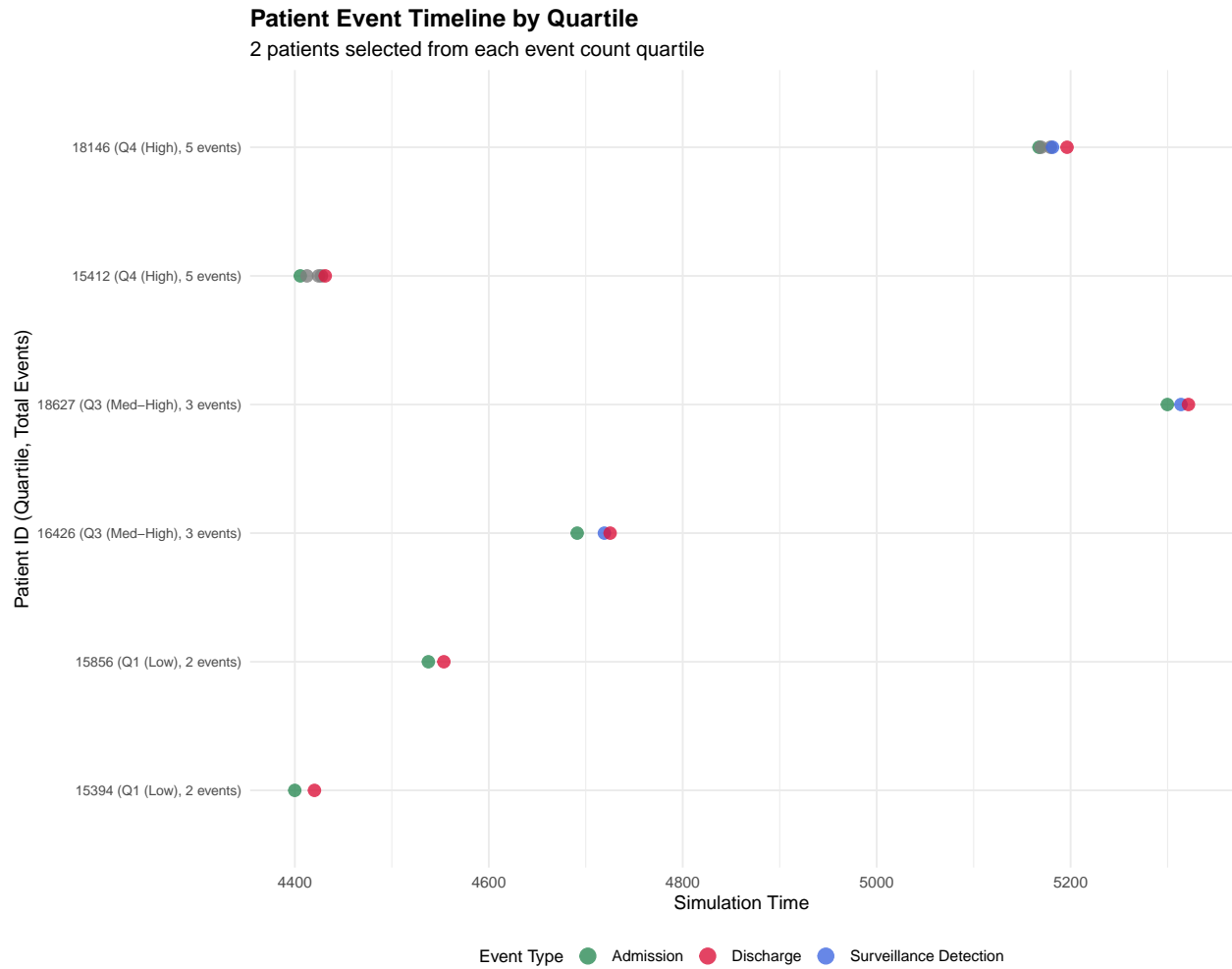
Quartile	N Patients	Min Events	Max Events	Median Events
Q1 (Low)	3660	2	2	2
Q3 (Med-High)	1953	3	4	3
Q4 (High)	757	5	12	5

Table 14: Selected Patients by Event Count Quartile (2 per quartile)

Patient ID	Quartile	Total Events	Admission Time	Discharge Time	Length of Stay	Colonized	Detected	Detection Count
15856	Q1 (Low)	2	4537.71	4553.70	15.99	false	false	0
15394	Q1 (Low)	2	4399.95	4420.25	20.30	false	false	0
18627	Q3 (Med-High)	3	5299.78	5321.51	21.72	true	true	0

Patient ID	Quartile	Total Events	Admission Time	Discharge Time	Length of Stay	Colonized	Detected	Detection Count
16426	Q3 (Med-High)	3	4691.18	4725.14	33.96	true	true	0
18146	Q4 (High)	5	5167.39	5196.30	28.91	true	true	0
15412	Q4 (High)	5	4405.66	4431.38	25.72	true	false	0

7.1 Quartile Timeline Visualization



7.2 Quartile Patient Details

7.2.1 Patient 15856 (Q1 (Low))

Patient Summary: - Quartile: Q1 (Low) - Total Events: 2 - Admission Time: 4537.71 - Discharge Time: 4553.7 - Length of Stay: 15.99 days - Colonized: No - Detected: No - Detection Count: 0

Table 15: Event History for Patient 15856 (Q1 (Low))

Time	Event Type
4537.71	Admission
4553.70	Discharge

7.2.2 Patient 15394 (Q1 (Low))

Patient Summary: - Quartile: Q1 (Low) - Total Events: 2 - Admission Time: 4399.95 - Discharge Time: 4420.25 - Length of Stay: 20.3 days - Colonized: No - Detected: No - Detection Count: 0

Table 16: Event History for Patient 15394 (Q1 (Low))

Time	Event Type
4399.95	Admission
4420.25	Discharge

7.2.3 Patient 18627 (Q3 (Med-High))

Patient Summary: - Quartile: Q3 (Med-High) - Total Events: 3 - Admission Time: 5299.78 - Discharge Time: 5321.51 - Length of Stay: 21.72 days - Colonized: Yes - Detected: Yes - Detection Count: 0

Table 17: Event History for Patient 18627 (Q3 (Med-High))

Time	Event Type
5299.78	Admission
5313.78	Surveillance Detection
5321.51	Discharge

7.2.4 Patient 16426 (Q3 (Med-High))

Patient Summary: - Quartile: Q3 (Med-High) - Total Events: 3 - Admission Time: 4691.18 - Discharge Time: 4725.14 - Length of Stay: 33.96 days - Colonized: Yes - Detected: Yes - Detection Count: 0

Table 18: Event History for Patient 16426 (Q3 (Med-High))

Time	Event Type
4691.18	Admission
4719.18	Surveillance Detection
4725.14	Discharge

7.2.5 Patient 18146 (Q4 (High))

Patient Summary: - Quartile: Q4 (High) - Total Events: 5 - Admission Time: 5167.39 - Discharge Time: 5196.3 - Length of Stay: 28.91 days - Colonized: Yes - Detected: Yes - Detection Count: 0

Table 19: Event History for Patient 18146 (Q4 (High))

Time	Event Type
5167.39	Admission
5169.60	Transmission (Recipient)
5179.18	Transmission (Source)
5181.39	Surveillance Detection
5196.30	Discharge

7.2.6 Patient 15412 (Q4 (High))

Patient Summary: - Quartile: Q4 (High) - Total Events: 5 - Admission Time: 4405.66 - Discharge Time: 4431.38 - Length of Stay: 25.72 days - Colonized: Yes - Detected: No - Detection Count: 0

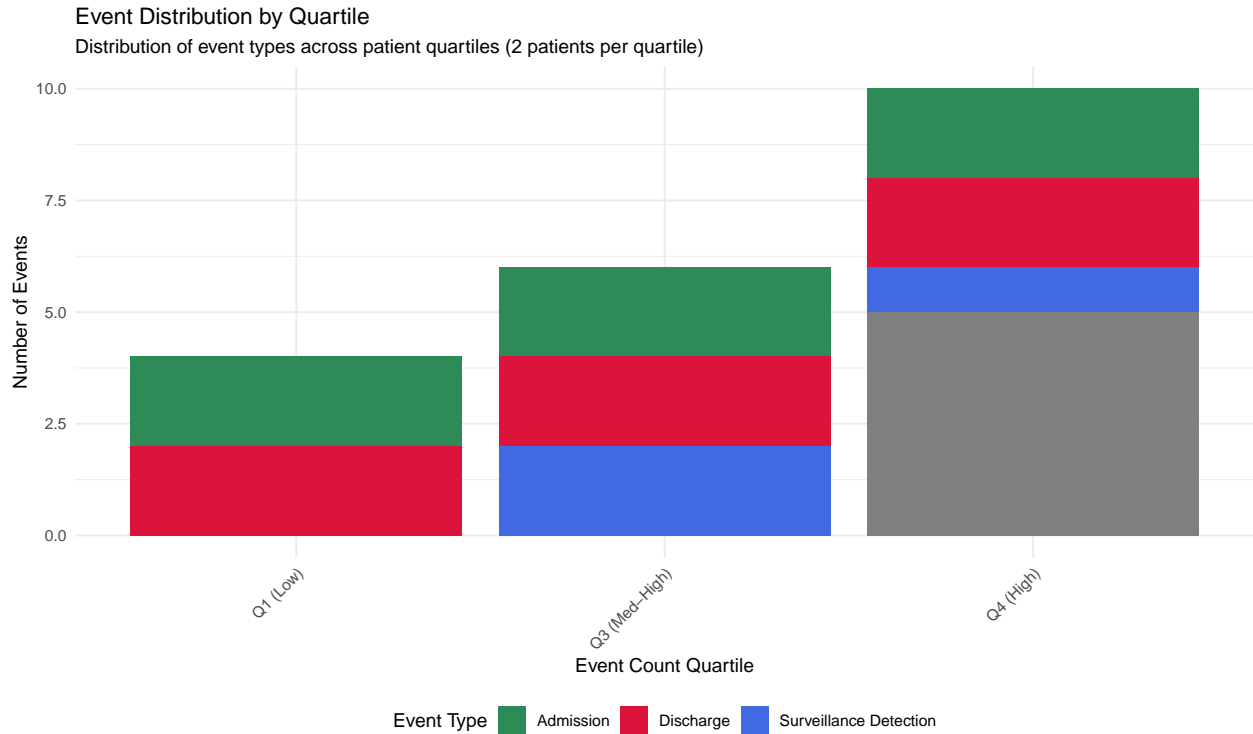
Table 20: Event History for Patient 15412 (Q4 (High))

Time	Event Type
4405.66	Admission
4412.53	Transmission (Source)
4424.44	Transmission (Source)
4427.44	Transmission (Source)
4431.38	Discharge

7.3 Quartile Comparison

Table 21: Event Type Distribution Across Quartiles

event_type	Q1 (Low)	Q3 (Med-High)	Q4 (High)
Admission	2	2	2
Discharge	2	2	2
Surveillance Detection	0	2	1
Transmission (Recipient)	0	0	1
Transmission (Source)	0	0	4



8 Conclusions

This analysis provides a comprehensive view of the event histories for both randomly selected patients and patients stratified by event count quartiles in the single-facility simulation. Key observations:

8.1 Random Sample Analysis (10 patients)

1. **Event Diversity:** The selected patients experienced various types of events including admissions, discharges, clinical detections, surveillance activities, decolonizations, and transmissions.
2. **Timeline Patterns:** The timeline visualization shows the temporal distribution of events and allows identification of patterns in patient care and disease progression.
3. **Individual Variations:** Each patient's event history is unique, reflecting the stochastic nature of the simulation and the individual patient characteristics.

8.2 Quartile Analysis (2 patients per quartile)

4. **Event Count Distribution:** Patients were stratified into quartiles based on their total number of events, revealing a range from low-activity to high-activity patients.
5. **Quartile Characteristics:**
 - **Q1 (Low):** Patients with minimal events, typically simple admission-discharge patterns
 - **Q2 (Low-Med):** Patients with moderate event activity
 - **Q3 (Med-High):** Patients with higher event complexity
 - **Q4 (High):** Patients with the most complex event histories, often involving multiple detections, transmissions, and interventions

6. **Event Type Patterns:** Higher quartile patients tend to have more detection events, transmission involvement, and treatment interventions, suggesting they represent more complex clinical cases.
7. **Clinical Implications:** The quartile analysis reveals that a subset of patients (Q4) experience disproportionately more events, which may represent:
 - Longer stays with more opportunities for events
 - Higher-risk patients more susceptible to colonization and transmission
 - Patients requiring more intensive monitoring and intervention

8.3 Methodological Insights

8. **Simulation Validation:** The range of patient experiences from simple to complex validates the simulation's ability to capture realistic patient heterogeneity.
9. **Risk Stratification:** The quartile approach provides a framework for identifying high-risk patients who may benefit from enhanced surveillance or intervention strategies.

This type of analysis is valuable for understanding patient-level dynamics in the simulation, validating model behavior across different patient complexity levels, and can inform both clinical practice and infection control policy development.