

TECHNION – Israel Institute of Technology
The William Davidson Faculty of Industrial Engineering and Management

Center for Service Enterprise Engineering (SEE)
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HomeHospital (Rambam)

Patient returns

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1. Data table

1.1 The return_visits_2004_2007 table

The **return_visits_2004_2007** table includes of all visits to hospital for period January 2004–October 2007, general information on each patient that enters the hospital on a particular day – each record in this table relates to a specific visit.

The following table enables to perform analyses such as: distribution of number of returns to hospital/ED/Internal wards/Oncology wards/wards via ED, distribution of time between returns to hospital/ED/Internal wards/Oncology wards/wards via ED (in days/in hours).

1.2 Description of fields

1. patient_id – the ID number of the patient
2. medical_id – the medical case number
3. gender – the gender of the patient (see Appendix 1: [gender](#)).
4. entry_unit – the hospital unit that the patient arrived at or was admitted to (see Appendix 1: [entry_exit](#)).
5. entry_group – indicates the entry group, specifically, Emergency Department or Direct entry into the Hospital Departments (see Appendix: [entry_group](#)).
6. first_department – the code of the first medical department to which the patient was admitted (see Appendix: [hospital_unit](#)).
7. first_ward – the code of the first medical ward to which the patient was admitted (see Appendix: [hospital_unit](#)).
8. exit_unit – the hospital unit from which the patient was released (see Appendix: [entry_exit](#)).
9. exit_group – indicates the exit group: Emergency Department or Hospital Department (see Appendix: [entry_group](#))
10. exit_department – the code of the hospital department from which the patient was released (see Appendix: [hospital_unit](#))
11. outcome – release type (Released (Home)/ Deceased/ to Medical Clinic/ Renunciation of Treatments /...) (see Appendix : [outcome_id](#))
12. entry_time^{**} – time in seconds at which the patient arrives at the hospital
13. hospitalization_time^{**} – time in seconds at which the patient was hospitalized
14. exit_time^{**} – time in seconds at which the patient was released
15. ED_dur – patient's length of stay in the Emergency department (in seconds).
16. ED_dur_hours – patient's length of stay in the Emergency department (in hours).
17. hospitalization_dur – patient's total length of stay in hospital departments (in seconds).
18. hospitalization_dur_hour – patient's total length of stay in hospital departments (in hours).
19. hospitalization_dur_days – patient's total length of stay in hospital departments (in days).
20. age_years[#] – patient's age upon arrival (in years).

^{**}Time units are seconds passed since 00:00:00, 01/01/1970

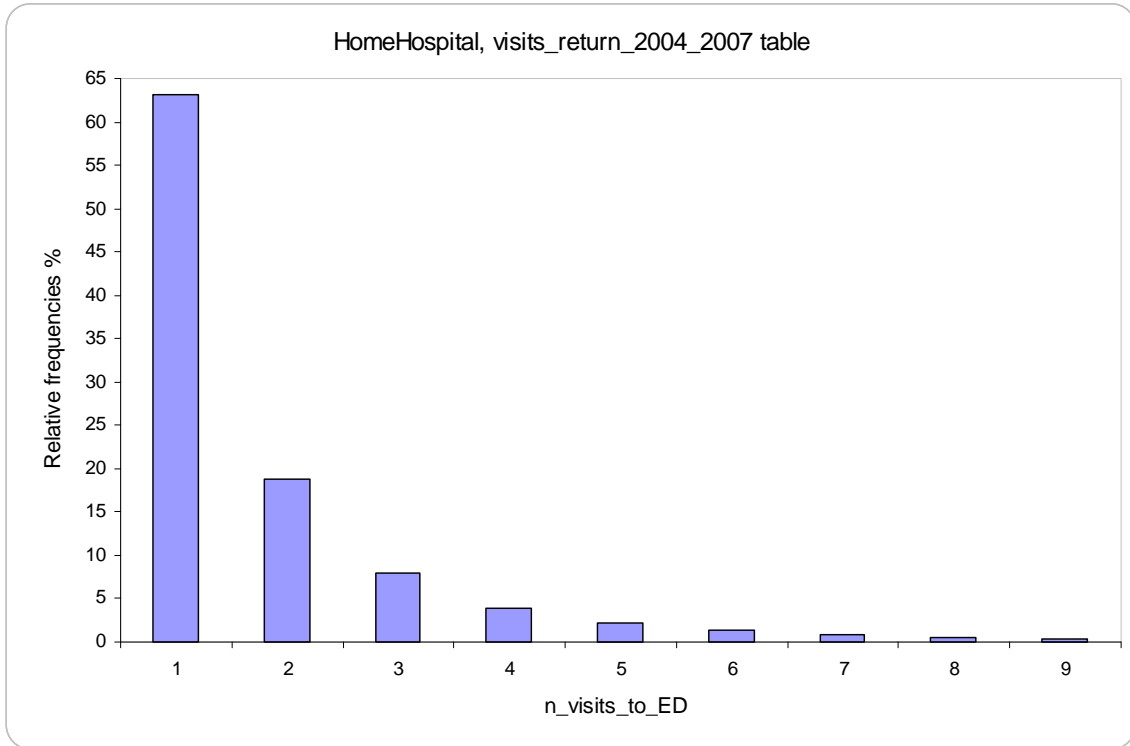
21. age_months – the number of months since the patient's last birthday.
22. num_dep - the department number in which the patient was hospitalized during his/her stay in the hospital
23. time_between_visits_hospital – time between visits to the hospital (in seconds).
24. time_between_visits_days_hospital – time between visits to the hospital (in days).
25. time_between_visits_hours_hospital – time between visits to hospital (in hours).
26. n_visits_to_hospital – totals number of visits to the hospital during the period January 2007–October 2007
27. visit_to_hospital – the serial number of a visit to the hospital
28. time_between_visits_ED – the time between visits to ED (in seconds).
29. time_between_visits_days_ED – the time between visits to ED (in days).
30. time_between_visits_hours_ED – the time between visits to ED (in hours).
31. n_visits_to_ED – totals number of visits to ED for period January 2007–October 2007.
32. visit_to_ED – serial number of visit a to the ED.
33. time_between_visits_Int_wards – the time between visits to Internal wards (A or B or C or D or E), in seconds
34. time_between_visits_days_Int_wards – the time between visits to Internal wards (A or B or C or D or E), in days
35. time_between_visits_hours_Int_wards – the time between visits to Internal wards (A or B or C or D or E), in hours
36. n_visits_to_Int_wards – totals number of visits to the Internal wards (A or B or C or D or E) for period January 2007–October 2007 (see Appendix: [Internal wards](#))
37. visit_to_Int_wards – serial number of visit to the Internal wards (A or B or C or D or E)
38. time_between_visits_wards_via_ED – time between visits to wards via ED, in seconds
39. time_between_visits_days_wards_via_ED – the time between visits to wards via ED, in days
40. time_between_visits_hours_wards_via_ED – the time between visits to wards via ED, in hours
41. n_visits_to_wards_via_ED – totals number visits to wards via ED for period January 2007–October 2007
42. visit_to_wards_via_ED – serial number of visit to wards via ED
43. time_between_visits_oncology – time between visits to oncology wards, in seconds
44. time_between_visits_days_oncology – time between visits to oncology wards, in days
45. time_between_visits_hours_oncology – time between visits to oncology wards, in hours
46. n_visits_to_oncology – totals number of visits to oncology wards for period January 2007–October 2007 (see Appendix: [oncology wards](#))
47. visit_to_oncology – serial number of visits to oncology wards
48. entry_date – date/time at which the patient arrives at the hospital
49. hospitalization_date – date/time at which the patient was hospitalized
50. exit_date – date/time at which the patient was released

[#]age of patient = age_years + age_months; when the patient's birth date is missing, then the value of the field age is stated to be equal to 999

2. Examples of charts

2.1 Patient returns to ED

Distribution number of visits to **ED**, January 2004–October 2007

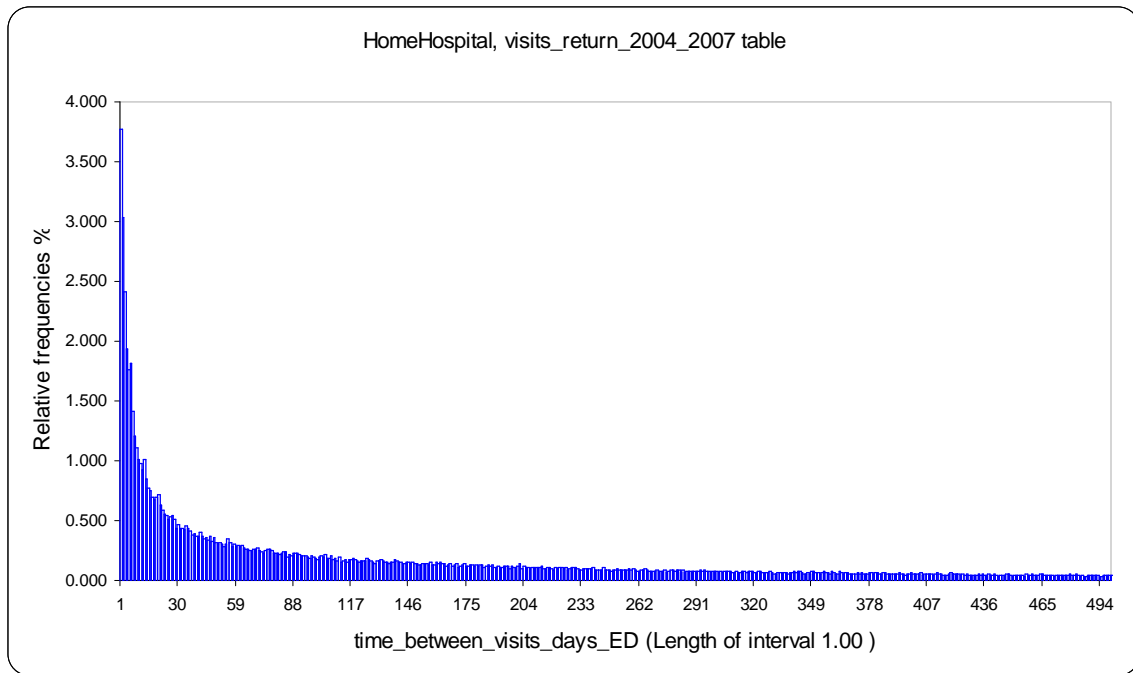


Statistics	
	<i>n_visits_to_ED</i>
N	243125
Mean	1.857
Standard Deviation	1.895
Variance	3.592
Median	1
Minimum	1
Maximum	103

Quantiles	
Quantile	<i>n_visits_to_ED</i>
99.5%	12.0
99%	9.0
97.45%	7.0
95%	5.0
90%	4.0
75% - Q3	2.0
50% - Median	1.0
25% - Q1	1.0
10%	1.0
2.5%	1.0
0.5%	1.0

Technical Notes: select records from visits_return_2004_2007 table where $n_visits_to_ED > 0$ and $visit_to_ED = 1$.

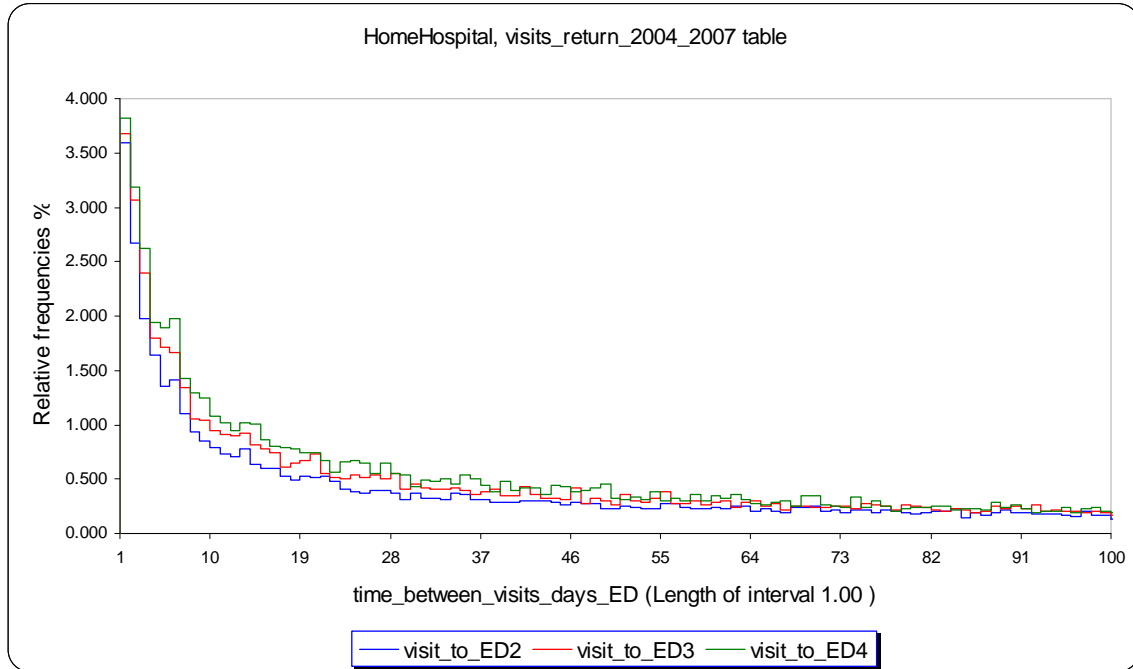
Distribution time between visits to ED (in days), January 2004–October 2007



Statistics	
	<i>time_between_visits_days_ED</i>
N	198895
Mean	196.06
Standard Deviation	252.54
Variance	63774
Median	87
Minimum	1
Maximum	1393

Quantiles	
Quantile	<i>time_between_visits_days_ED</i>
99.5%	1169.0
99%	1085.0
97.45%	926.0
95%	764.0
90%	566.0
75% - Q3	281.0
50% - Median	87.0
25% - Q1	17.0
10%	4.0
2.5%	1.0
0.5%	1.0

Distribution time between visits to ED (in days), by visit number, January 2004–October 2007



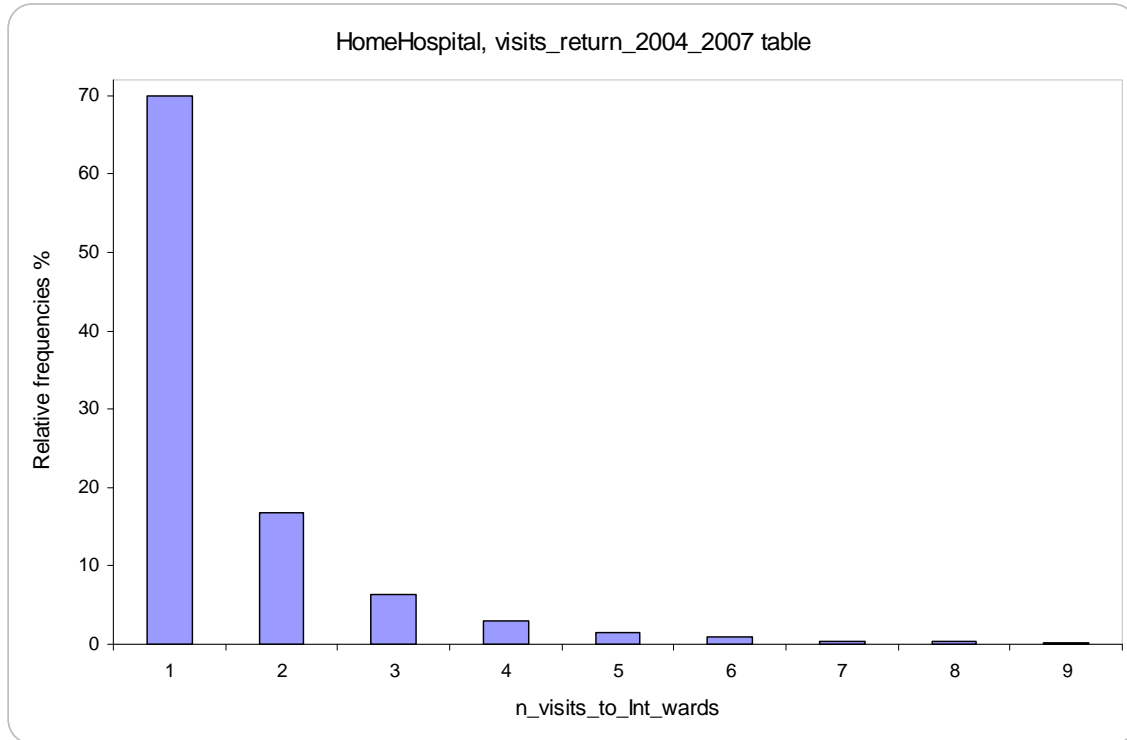
Statistics			
	visit_to_-_ED2	visit_to_-_ED3	visit_to_-_ED4
N	85279	41937	23395
Mean	261.29	193	157.9
Standard Deviation	294.87	238.45	206.22
Variance	86950	56860	42527
Median	146	94	70
Minimum	1	1	1
Maximum	1393	1383	1377

Quantiles			
Quantile	visit_to_-_ED2	visit_to_-_ED3	visit_to_-_ED4
99.5%	1232.0	1102	1005
99%	1171.0	1027	915
97.45%	1044.0	870	757
95%	901.0	722	609
90%	720.0	538	448
75% - Q3	404.0	283	222
50% - Median	146.0	94	70
25% - Q1	27.0	18	15
10%	5.0	4	4
2.5%	1.0	1	1
0.5%	1.0	1	1

2.2 Patient returns to Wards

2.2.1 Internal Wards

Distribution number of visits to **Internal Wards A–E**, January 2004–October 2007

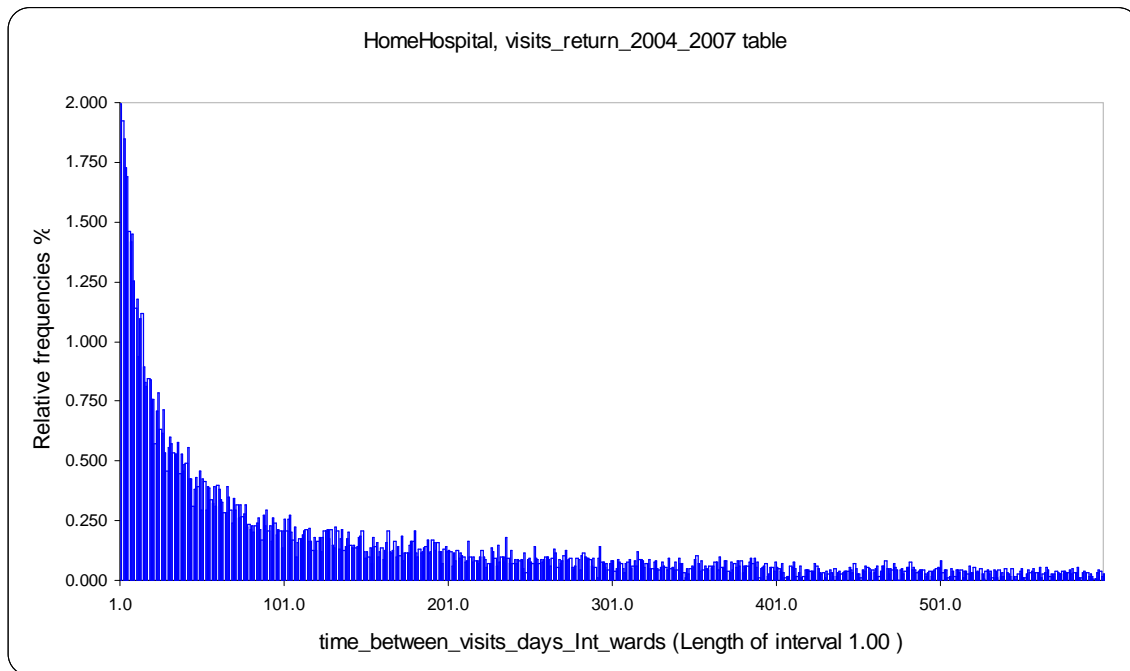


Statistics	
	<i>n_visits_to_Int_wards</i>
N	26350
Mean	1.62
Standard Deviation	1.456
Variance	2.12
Median	1
Minimum	1
Maximum	39

Quantiles	
Quantile	<i>n_visits_to_Int_wards</i>
99.5%	9.0
99%	8.0
97.45%	5.0
95%	4.0
90%	3.0
75% - Q3	2.0
50% - Median	1.0
25% - Q1	1.0
10%	1.0
2.5%	1.0
0.5%	1.0

Technical Notes: select records from visits_return_2004_2007 table where $n_visits_to_Int_wards > 0$ and $visit_to_Int_wards = 1$.

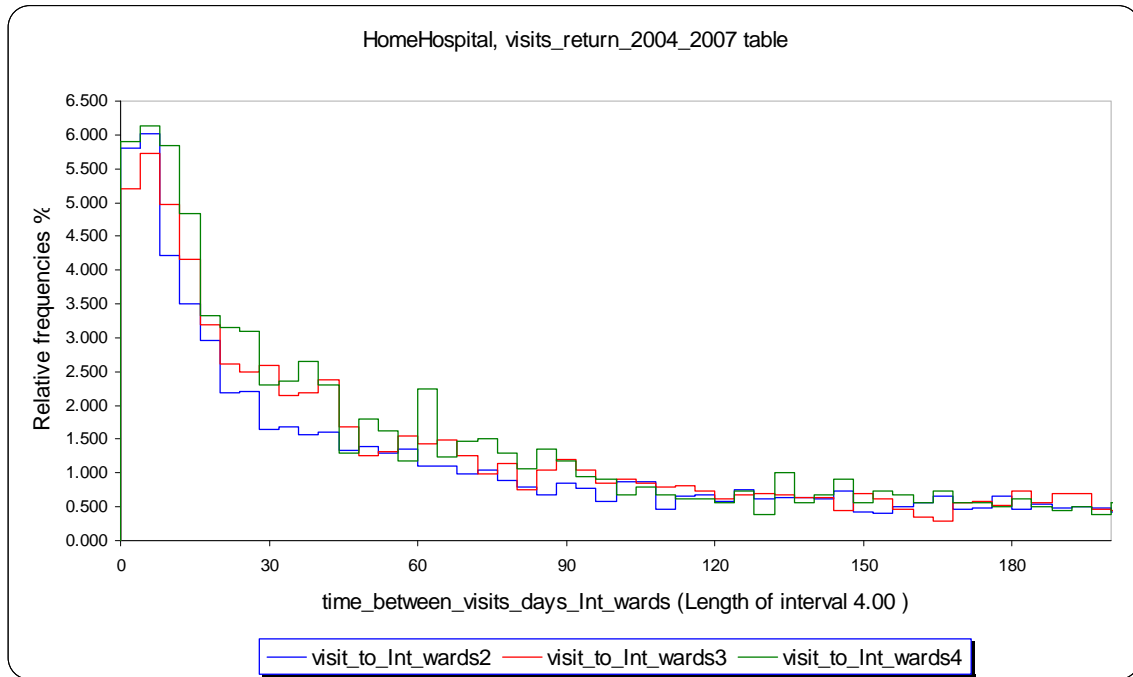
Distribution time between visits to [Internal Wards A–E](#), January 2004–October 2007



Statistics	
	<i>time_between_visits_days_Int_wards</i>
N	16083
Mean	180.93
Standard Deviation	236.07
Variance	55729
Median	78
Minimum	1
Maximum	1331

Quantiles	
Quantiles	<i>time_between_visits_days_Int_wards</i>
99.5%	1131.0
99%	1045.0
97.45%	883.0
95%	710.0
90%	518.0
75% - Q3	251.0
50% - Median	78.0
25% - Q1	20.0
10%	6.0
2.5%	2.0
0.5%	1.0

Distribution time between visits to Internal Wards A–E, by visit number, January 2004–October 2007

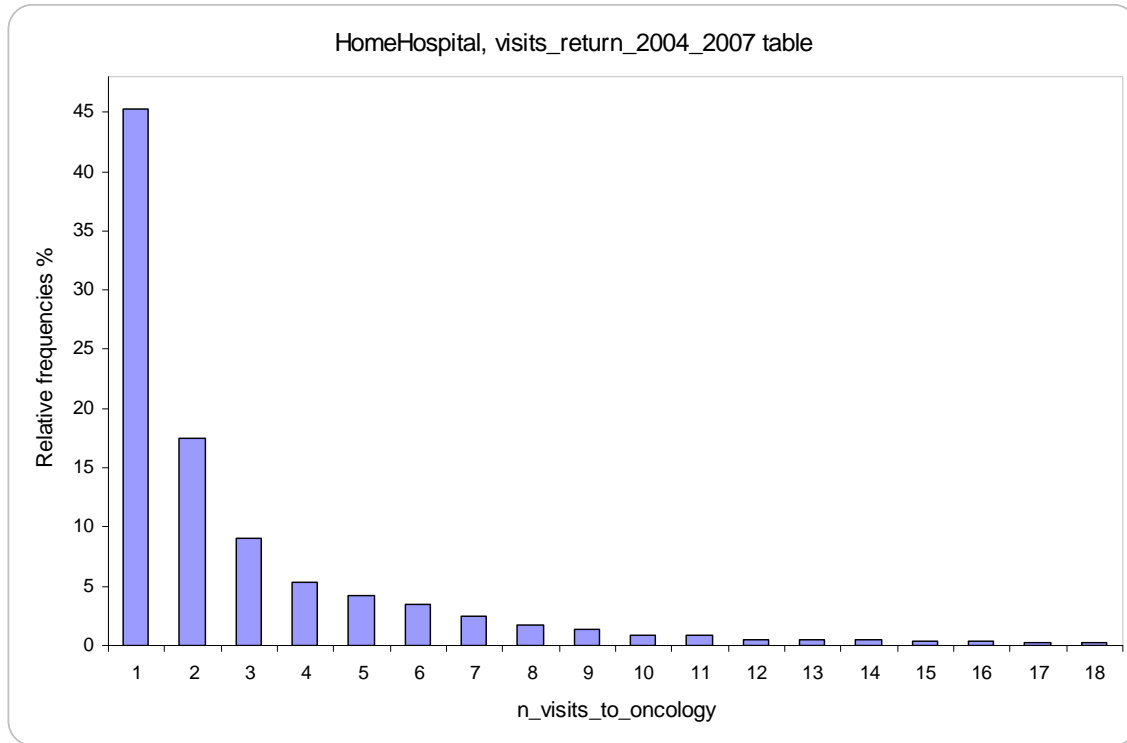


Statistics			
	visit_to - _Int_wards2	visit_to - _Int_wards3	visit_to - _Int_wards4
N	7817	3443	1778
Mean	226.54	175.13	138.53
Standard Deviation	270.94	222.75	181.79
Variance	73409	49618	33048
Median	113	81	63
Minimum	1	1	1
Maximum	1331	1238	1213

Quantiles			
Quantile	visit_to - _Int_wards2	visit_to - _Int_wards3	visit_to - _Int_wards4
99.5%	1168.0	1065	918
99%	1117.0	996	846
97.45%	990.0	852	699
95%	827.0	664	529
90%	639.0	496	382
75% - Q3	341.0	242	186
50% - Median	113.0	81	63
25% - Q1	24.0	22	18
10%	6.0	7	6
2.5%	2.0	2	2
0.5%	1.0	1	1

2.2.2 Oncology wards

Distribution number of visits to **Oncology Wards**, January 2004–October 2007

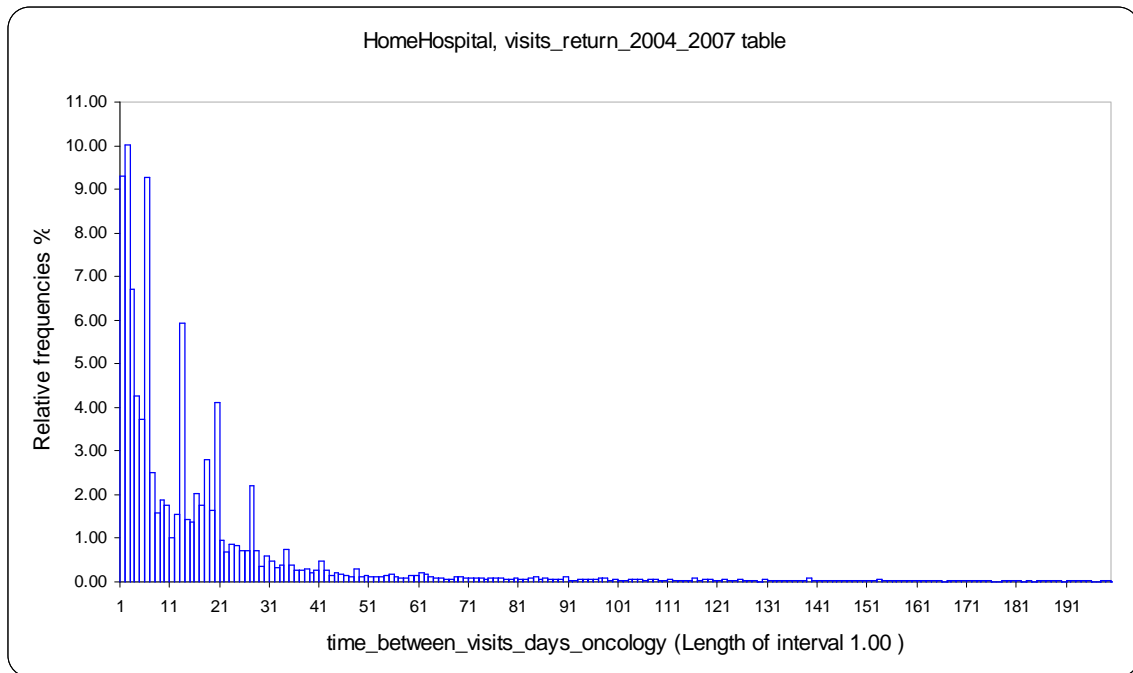


Statistics	
	<i>n_visits_to_oncology</i>
N	6245
Mean	5.162
Standard Deviation	12.4
Variance	153.76
Median	2
Minimum	1
Maximum	163

Quantiles	
Quantile	<i>n_visits_to_oncology</i>
99.5%	92.0
99%	75.0
97.45%	39.0
95%	18.0
90%	9.0
75% - Q3	4.0
50% - Median	2.0
25% - Q1	1.0
10%	1.0
2.5%	1.0
0.5%	1.0

Technical Notes: select records from visits_return_2004_2007 table where $n_visits_to_oncology > 0$ and $visit_to_oncology = 1$.

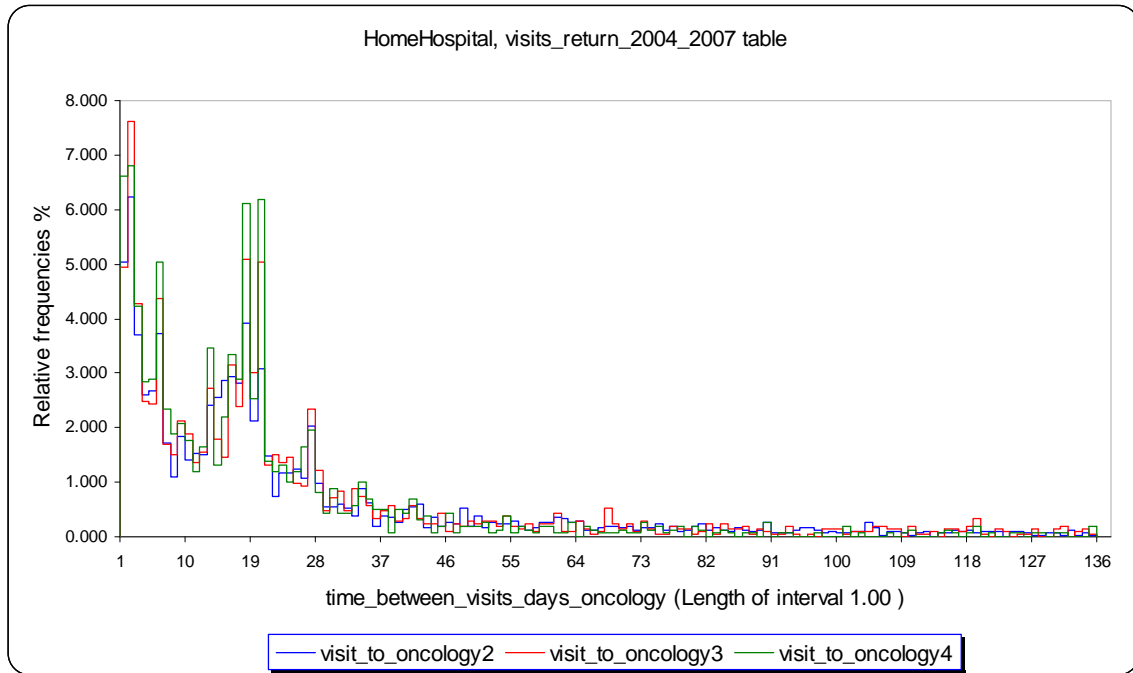
Distribution time between visits to **Oncology Wards**, January 2004–October 2007



Statistics	
	<i>time_between_visits_days_oncology</i>
N	22515
Mean	30.6
Standard Deviation	79.19
Variance	6270.6
Median	10
Minimum	1
Maximum	1285

Quantiles	
Quantile	<i>time_between_vists_days_oncology</i>
99.5%	570.0
99%	404.0
97.45%	249.0
95%	135.0
90%	58.0
75% - Q3	21.0
50% - Median	10.0
25% - Q1	3.0
10%	2.0
2.5%	1.0
0.5%	1.0

Distribution time between visits to **Oncology Wards, by **visit number**, January 2004–October 2007**



Statistics			
	visit_to_-_oncology2	visit_to_-_oncology3	visit_to_-_oncology4
N	3062	2128	1586
Mean	66.04	44.84	38.18
Standard Deviation	131.14	97.24	91.21
Variance	17199	9455.8	8319.1
Median	18	18	17
Minimum	1	1	1
Maximum	1201	1285	1109

Quantiles			
Quantile	visit_to_-_oncology2	visit_to_-_oncology3	visit_to_-_oncology4
99.5%	790.0	671	663
99%	695.0	494	475
97.45%	452.0	318	299
95%	329.0	188	170
90%	190.0	106	73
75% - Q3	51.0	33	26
50% - Median	18.0	18	17
25% - Q1	7.0	6	6
10%	2.0	2	2
2.5%	1.0	1	1
0.5%	1.0	1	1

Appendix: Dictionaries

<i>entry_exit</i>	
1	Emergency Internal Medicine Unit
2	Emergency Surgery Unit
3	Emergency Traumatology Unit
4	Emergency Orthopedic Unit
5	Emergency Otorhinolaryngology Unit
6	Emergency Ophthalmology Unit
7	Emergency Psychiatry Unit
8	Emergency Gynecology Unit
9	Pediatric Emergency Unit
10	Pediatric Surgery Emergency Unit
11	Emergency Maternity Unit
12	Hospitalization
13	Internal Medicine Division
14	Division of Surgery
15	Division of Obstetrics and Gynecology
16	Department of Anesthesiology
17	Pediatrics Department
18	Department of Pediatric Surgery
19	Division of Laboratory Services
20	Oncology Institute
22	Delay
23	Other DRG
24	Clinic
25	Trauma Unit (road accidents)
26	Trauma Unit (industrial accident)
30	Unknown

<i>entry group</i>	
1	Emergency Room
2	Hospital

<i>hospital unit</i>	
1	Emergency Internal Medicine Unit
2	Emergency Surgery Unit
3	Emergency Traumatology Unit
4	Emergency Orthopedic Unit
5	Emergency Otorhinolaryngology Unit
6	Emergency Ophthalmology Unit
7	Emergency Psychiatry Unit
8	Emergency Gynecology Unit
9	Pediatric Emergency Unit
10	Pediatric Emergency Surgery Unit
11	Emergency Maternity Unit
12	Chemotherapy Outpatient Center
13	Institute of Oncology
14	Chemotherapy Inpatient Oncology Unit
15	Radiotherapy Inpatient Oncology Unit
16	Institute for Immunology, Allergy and AIDS
17	Institute of Gastroenterology
18	Intensive Care Unit Gastroenterology
19	Institute of Hematology and Bone Marrow Transplant
20	Pediatric Hematology and Oncology Department2
21	Institute of Hematology and Bone Marrow Transplant1
22	Thrombosis and Hemostasis Unit
23	Department of Intensive and Critical Medicine
24	Department of Neurology
25	Cognitive Neurology Unit
26	EEG Institute
27	Department of Nephrology
28	Hypertension Clinic
29	Hemodialysis Unit
30	Kidney Transplant Unit
31	Institute of Endocrinology, Diabetes and Metabolism
32	Bone and Calcium Metabolism Unit
33	Department of Dermatology
34	Phototherapy Unit
35	Internal Medicine A
36	Intensive Care Unit A
37	Internal Medicine B
38	Intensive Care Unit B
39	Internal Medicine C
40	Intensive Care Unit C
41	Internal Medicine D
42	Intensive Care Unit D

43	Internal Medicine E
44	Intensive Care Unit
45	Internal Medicine Military
46	Department of Cardiology
47	Intensive Cardiac Care Unit
48	Arrhythmia and Electrophysiology (Pacemakers)
49	Congestive Heart Failure Clinic
50	Interventional (Angioplasty) Cardiology
51	Department of Rheumatology
52	Institute of Pulmonology
53	Pain Relief Unit
54	Department of Urology
55	Neuro-Urology Unit
56	Department of Otorhinolaryngology
57	Orthopedics A – Department
58	Orthopedics A – Department1
59	Orthopedic Oncology
60	Orthopedics B – Department
61	Orthopedics B – Department1
62	Department of General Surgery A
63	Department of General Surgery B
64	Department of Plastic Surgery
65	Intensive Care Burn Unit
66	Department of Thoracic Surgery
67	Hand Surgery Unit
68	Department of Vascular Surgery and Transplantation
69	Department of Cardiac Surgery
70	Intensive Care of Cardiac Surgery Unit
71	Department of Neurosurgery
72	Intensive Care of Neurosurgery Unit
73	Neuro-Oncology
74	Department of Maternity A
75	Department of Maternity B
76	Department of Newborn Care
77	Labor and Delivery Rooms
78	Department of Gynecology
79	Neonatal Intensive Care Unit (NICU)
80	Onco-Gynecology Unit
81	Endo-Gynecology Unit
82	High Risk Pregnancy Unit
83	Department of Psychiatry and Mental Health
84	Psychopathic Ward 5
85	Psychopathic Ward 6
86	Day Care Psychiatry Unit

87	Psychogeriatric Service
88	Department of Ophthalmology
89	Department of Oral and Maxillofacial Surgery
90	Institute of Endocrinology, Diabetes and Metabolism1
91	Proctology
92	Pathology Laboratory
93	Radiology Laboratory
94	Post–Anesthesia Recovery Unit
95	Ambulatory Operating Room
96	Pre–Operating Room
97	Delay
98	Hospitalization
99	Unit High Risk Pregnancy Unit
100	Department of Plastic Surgery (suture)
101	Emergency Medicine Unit1
102	Department of Pediatrics A
103	Department of Pediatrics B
104	Department of Pediatric Surgery
105	Pediatric Plastic Surgery Unit
106	Pediatric Oncology and Bone Marrow Transplant Unit
107	Pediatric Intensive Care Unit
108	Pediatric Hematology and Oncology Department
109	Pediatric Urology Clinic
110	Pediatric Orthopedics Unit
111	Pediatric Immunology and Allergy
112	Pediatric Endocrinology Clinic
113	Pediatric Otorhinolaryngology Unit
114	Pediatric Gastroenterology and Nutrition Unit
115	Pediatric Hemodialysis Unit
116	Pediatric Metabolism Unit
117	Pediatric Hematology and Oncology Department1
118	Department of Infectious Diseases
119	Pediatric Neurosurgery Unit
120	Department of Pediatric Cardiology
121	Pediatric Rheumatology Clinic
122	Pediatric Pulmonary Unit
123	Child and Adolescent Psychiatry Service
124	Pediatric Nephrology Unit
125	Pediatric Diabetes and Obesity Clinic
126	Pediatric Oral and Maxillofacial Surgery
127	Institute of Breast Health
128	Mammography Unit
129	Trauma Unit (road accidents)

130	Institute for Occupational Health
131	School of Radiology and Imaging
132	Institute of Nuclear Medicine
133	Computed Tomography Unit
134	Ultrasound Unit
135	Ultrasound Unit1
136	Ultrasound Unit2
137	Magnetic Resonance Imaging Unit
138	Oncology Clinic
139	Orthopedic Clinic
140	Orthopedic Clinic6
141	Ilizarov External Fixation Clinic
142	Eating Disorders Clinic
143	Institute of Breast Health (image-guided biopsies)
144	Orthopedic Clinic1
145	Orthopedic Clinic5
146	Orthopedic Clinic4
147	Non-Invasive Cardiology Unit
148	Hemodialysis Clinic
149	Hypertension Clinic1
150	Plastic Surgery Clinic
151	Plastic Surgery Clinic (Burn)
152	Lipid Disorders Clinic
153	Liver Clinic
154	Orthopedic Clinic7
155	Orthopedic Clinic3
156	Pain Relief Clinic
157	Neuro-Urology Clinic
158	Gynecology Clinic
159	Fertility and Sperm Bank Clinic
160	Periodontics and Oral Medicine Clinic
161	Medicinal Plant Clinic (violent patients unit)
162	Dental Clinic
163	Rehabilitation Heart Clinic
164	Institute for Occupational Health1
165	Pediatric Hematology and Oncology Clinic
166	Pediatric Hematology and Oncology Clinic1
167	Pediatric Neurosurgery Clinic
168	Immunology and Tissue Classification Laboratory
169	Endocrinology Laboratory
170	Biochemistry Laboratory
171	Blood Bank Laboratory
172	Sperm Bank Laboratory
173	Urgent Testing Laboratory

174	Toxicology Laboratory
175	Biochemistry Laboratory1
176	Microbiology Laboratory
177	Neurosurgery Laboratory
178	Cytology Laboratory
179	Ministry of Defense (rehabilitation)
180	Institute for Periodic Examinations
181	Invasive Imaging Tests
182	Hydrotherapy Pool (rehabilitative)
183	Orthopedic Clinic2
184	Department of Vascular Surgery and Transplantation1
185	Gynecology Clinic2
186	Department of Clinical Nutrition
187	X-ray Screening
188	Unknown2
189	Neurosurgery
190	Unknown1
191	Bone and Calcium Metabolism Unit1
192	Hearing and Speech Unit
193	Nutrition and Dietary Unit
194	Department of Physical Therapy
195	Bone Marrow Transplant Unit
196	Hemodialysis Clinic1
197	Endodontics and Dental Trauma Unit
198	Gynecology Clinic1
200	Unknown

<i>gender</i>	
1	Male
2	Female
3	Unknown

<i>outcome_id</i>	
1	Emergency Room
2	Hospitalization
3	Removing
4	Beginning Removing
5	Completion Removing
6	Receiving
7	Released (Home)
8	Left on His Own
9	Left with Medical File
10	Deceased
11	Renunciation of Treatments
12	Cancellation
13	Medical Clinic
14	Other Institution
15	Other
20	Unknown

<i>oncology_wards</i>
14 Chemotherapy Inpatient Oncology Unit
15 Radiotherapy Inpatient Oncology Unit
20 Pediatric Hematology and Oncology Department2
21 Institute of Hematology and Bone Marrow Transplant1
59 Orthopedic Oncology
80 Onco-Gynecology Unit
106 Pediatric Oncology and Bone Marrow Transplant Unit
108 Pediatric Hematology and Oncology Department

<i>Internal_wards</i>
35 Internal Medicine A
37 Internal Medicine B
39 Internal Medicine C
41 Internal Medicine D
43 Internal Medicine E