PLANNING, DESIGN AND MANAGEMENT OF PUBLIC NURSING HOME IN SINGAPORE

CHAN SENG KEE

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF ENGINEERING

IN
ARCHITECTURAL PLANNING AND URBAN DESIGN SYSTEM RESEARCH GROUP DIVISION
DEPARTMENT OF SYSTEMS ENGINEERING
GRADUATE SCHOOL OF ENGINEERING
MIE UNIVERSITY

SUPERVISOR PROFESSOR AKIKAZU KATO
2017

© CHAN SENG KEE, 2017
DEDICATION

The objective to seek the ‘truth’ in healthcare built-environment is a crusade. It is the hope that the thesis may validate Singapore’s achievements as well as to highlight the issues that could have been avoided and handled differently. The seed for truth towards excellence was implanted in the author by his late mother, Madam How Mew Yong. This thesis is dedicated to his late mother and to ALL who are committed to continually improve the built environment for the less abled and for the wellbeing of ALL.
ACKNOWLEDGEMENTS

I wish to express my sincerest appreciation to my supervisor, Professor Akikazu Kato of Mie University for his continual encouragement to pursue the doctoral study and his patience during the preparation of the thesis.

I would like to thank and am grateful to Coordinating Minister for Infrastructure & Minister for Transport Khaw Boon Wan for his kind expression in the ‘To Whom It May Concern’ letter.

I am thankful to the Minister of Health Gan Kim Yong’s direction which led to the generous support of advice and information by Ms. Gwenda Fong, Deputy Director (Ageing Planning Office) Ministry of Health.

I thank the jury members, Professor Masuro Urayama, Professor Yoshito Tomioka and Associate Professor Atsushi Otsuki of Mie University for their encouragement and professional assessment over the several sessions during the preparation of the doctoral thesis.

My gratitude to Dr. Shiho Mori for her friendship and her consent to reproduce in full her paper, to Ar. Wong Munn Sum of WOHA Architects for the conversation we had and his consent and issuance of WOHA’s paper on Admiralty Integrated Development, Mr Richard Kuppusamy, Project Architect of WOHA for his clear explanation of the documents.

I list here many of the people who were kind enough to respond to questionnaires and provide information: Mr. Kam Mun Wai C&S Professional Engineer, Mr. Tan Wai Houng M&E Professional Engineer of Meinhardt (Singapore) Pte Ltd; Mr. Eddie Yee, Project Director of Langdon&Seah (QS); and Ms. Winnie Chan, Deputy Executive Director of St Andrew’s Nursing Home.

The Visits to the several hospitals and homes would not have been fruitful without the good supports and guidance from: Mr. Charles, Lingam, Chief Executive Officer and Ms. Jeng of Sunlove Home; Ms. Peng Xinyi, Cindy; Care Standards and Facilities Management Officer of Ministry of Social and Family Development; Mr. Foo Hee Jug, Chief Executive Officer and Ms. Wee Suat Nee, of Jurong Health – Ng Teng Fong General Hospital; Mr. Alson Goh, Chief
Operating Officer and Mr. Michael Ng, Director of Operation Support Services of KK Women’s and Children’s Hospital.

I would also like to thank M/s Kato, Masayuki; Reiko, Hara; Kanae, Mochiduki; Misato Takehara; Takei, Azusa; Yangdong Zhang; Ryohei, Seki; Fukuhara, Shunsuke; for their work prepared during their internship in DEG Architects.

Others who provided support and assistance throughout the research and writing include: Mr. Au Man Kwong, Mr. Chan Kok Leong., Ms. Chan Peck San, Alvin Ng and Mr. Kelvin Chew of DEG Architects, who assisted in the initial stages of the Psychiatric Nursing Home Project. Finally, I would thank Mr. John Spyropoulos and Mr. Au Man Kwong for their valuable editorial assistance and constant input especially during the finalization of the doctoral thesis, my wife Serene for her chaperoning me to Mie University and my daughter Peck Min for her contribution to draft and redraft various papers. Her constant encouragement and constructive criticism while in Singapore and from Trinity College studying medicine in Dublin is appreciated.

To all that I may have inadvertently missed to acknowledge, I thank you and hope that you will understand. The thesis would not have been completed without your support and blessing.
ABSTRACT

It is a worldwide norm that when a country’s political, social and economic system change, its healthcare system, including its public nursing homes and facilities, will also inevitably and invariably be changed. Singapore’s three immediate priorities, at the start of independence in 1965, were to gain international recognition for its independence; to plan a strong defense that would “defend this piece of real estate; and thirdly to energize the economy on how to make a living for our people”. The Minister for Health at that time, Yong Nyuk Lin stated the situation clearly and bluntly: “Health would rank, at the most, fifth in order of priority” for public funds.

Singapore celebrated its 50th birthday in 2015 and its greater affluence brought about higher level of demand on needs, wants and expectations. The demand is further compounded by the rapidly aging society, smaller family size, the growing longevity of its population, the emergence of new generation of residential users, shifting of stay in hospital wards to home stay and the surfacing of the filial piety’s issue.

The study sets itself to examine Singapore’s past years of achievements and shortcomings on healthcare, especially in public nursing homes, within its growth from third to first world economy. It tackles the issues of planning, design and management of nursing homes within Singapore’s welfare-framework in its multiethnic society, its urban fabric of medium and high rise buildings and its high dependency on foreign caregivers for the elderly.

A case-study of the new 7-storey 300-bedded high-rise psychiatric nursing home is made as Government’s primary objective and aim to create a new model of a built-environment. It had to meet the challenges and to gain the benefits from the participating collaborative efforts of the residents, caregivers and care-providers. Comparative case study of other local and foreign cases is also made to learn the good efforts achieved towards higher excellence in healthcare built environment.

The study concludes with the documentations of all the findings and contributions within each governing parameters and also the responsibility of all and different stakeholders. It makes recommendations base on an honest appraisal of ‘myth and magic’ of the Built-Environment
of public nursing homes in Singapore. Finally, it discusses the societal issues that affect the planning, design and management these homes and the politics that govern them.
TABLE OF CONTENTS

DEDICATION..............................................................................................................i

ACKNOWLEDGEMENTS ........................................................................................... iii

ABSTRACT.................................................................................................................. v

TABLE OF CONTENTS .............................................................................................. vii

LIST OF TABLES ...................................................................................................... xiii

LIST OF FIGURES ................................................................................................... xv

PREFACE.................................................................................................................... xix

CHAPTER 1 - INTRODUCTION.................................................................................. 1

1.1 Background ......................................................................................................... 1

1.2 Overview of Healthcare in Singapore ................................................................. 4

1.2.1 Colonial Era until Independence ................................................................. 4

1.2.2 Post Independence .................................................................................... 6

1.2.3 Nursing Profession .................................................................................... 7

1.2.4 Social Welfare .......................................................................................... 9

1.3 Objectives ......................................................................................................... 10

1.4 Methodology .................................................................................................... 11

1.5 Definitions ........................................................................................................ 14

1.6 Conclusion ...................................................................................................... 15

References ............................................................................................................. 17

CHAPTER 2 - ASPECTS OF NURSING HOMES AND HOSPITALS IN JAPAN ........ 19

2.1 Planning Characteristics in Unit-Type Nursing Homes ..................................... 19

2.1.1 Introduction ............................................................................................. 19
2.1.2 The Characteristics of Unit-Type Nursing Homes ........................................... 20
2.1.3 Research Objectives and Methodology .......................................................... 21
2.1.4 Analysis Results ......................................................................................... 21
2.1.5 How Consciously is Care Staff Arrangement Considered in Design of Floor Plans? 26
2.1.6 Conclusion .................................................................................................. 29
2.2 Planning and Design Issues of Single Bed Room Inpatient Quarters .................. 30
2.2.1 Discussion .................................................................................................. 30
2.2.2 Survey and Result ...................................................................................... 32
2.2.3 Conclusion .................................................................................................. 34
2.3 Behavioral Considerations of Bringing Personal Articles and Communications at Wards in Hospital ................................................................................................. 34
2.3.1 Survey findings .......................................................................................... 36
2.3.2 Conclusion .................................................................................................. 39
2.4 The Impact of Inpatients’ Belongings on their Behaviors in Multiple-Bed Room in Japanese Hospitals. A Study on Healing Environment for Early Patient Recovery. ...... 39
2.4.1 Research Objectives and Methodology ........................................................ 39
2.4.2 Results ....................................................................................................... 41
2.4.3 Partitioning Furniture in Multiple Bed Rooms ............................................ 44
2.4.4 View on Materials in Medical and Welfare Facilities .................................... 45
2.4.5 Placements of Materials ............................................................................ 45
2.4.6. Conclusion ................................................................................................ 47
2.5 Planning and Design Issues of Single Bed Room Inpatient Quarters in a Cross-Cultural and Multi-Disciplinary Exchange Context ................................................................. 48
2.5.1 Rediscovery of Nightingale Ward ................................................................ 48
2.5.2 Katta Public General Hospital ..................................................................... 49
2.5.3 Evelina Children's Hospital ......................................................................... 49
2.5.4 Privacy vs. Supervision ............................................................................. 50
2.5.5 Merits and Demerits of Single Bed Room and Multiple Bed Room ............. 50
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5.6 Survey and Results</td>
<td>51</td>
</tr>
<tr>
<td>2.5.7 Patient's Behaviors</td>
<td>51</td>
</tr>
<tr>
<td>2.5.8 Partitioning Furniture in Multiple Bed Rooms</td>
<td>53</td>
</tr>
<tr>
<td>2.5.9 View on Materials in Medical and Welfare facilities</td>
<td>53</td>
</tr>
<tr>
<td>2.5.10 Conclusion</td>
<td>54</td>
</tr>
<tr>
<td>2.6 Highlights on Lessons Learnt</td>
<td>54</td>
</tr>
<tr>
<td>References</td>
<td>57</td>
</tr>
</tbody>
</table>

**CHAPTER 3 - EXISTING PUBLIC NURSING HOMES IN SINGAPORE** .......... 59

3.1 Public Nursing Homes in Singapore                                   59

3.1.1 Context, Time and Circumstances                                    59

3.1.2 Classification of Different Types of Nursing Homes in Singapore    61

3.2 Survey on Existing Nursing Homes                                     63

3.2.1 Research Method                                                    64

3.2.2 Facilities Composition                                            67

3.2.3 Room Composition                                                   68

3.2.4 Common Feature of the Facilities                                  69

3.2.5 Survey Findings                                                   69

3.2.6 Conclusion                                                        75

References                                                              77

**CHAPTER 4 - CASE STUDY OF THE NEW 300-BEDDED 7-STOREY HIGH-RISE PSYCHIATRIC NURSING HOME, SINGAPORE** .................................................. 81

4.1 Design Brief                                                         82

4.1.1 Design Concept/Philosophy                                          83

4.2 Literature Reviews                                                   85

4.3 Design Process                                                       87

4.3.1 Survey on Existing Nursing Homes                                   90

4.3.2 User Participation                                                 91
# TABLE OF CONTENTS

4.3.3 Preliminary Design ......................................................................................... 93
4.3.4.1 Study Plan ................................................................................................. 99
4.3.5 Towards the Ideal Facilities ............................................................................ 109
4.3.6 Final Design .................................................................................................... 112
4.4 The Value of Ramp ............................................................................................. 120
4.5 Planning and Management .................................................................................. 126
4.5.1 Observation and Evaluation ........................................................................... 131
4.5.2 Change of Organization Structure of Project Team at Tender and Post Tender Stage .. 131
4.5.3 Change in Project Management Procedure ..................................................... 134
4.5.4 Facility Management ....................................................................................... 135
4.6 Conclusion ........................................................................................................... 137
References ..................................................................................................................... 141

# CHAPTER 5 – CONCLUSIONS AND RECOMMENDATIONS .......................... 145

5.1 Conclusions ........................................................................................................ 145
5.1.1 Better Results in a Better Built Environment .................................................. 145
5.1.2 Impact / Issues of High Rise Developments ................................................... 147
5.1.3 Better Solutions through Research, Building Performance Evaluation of Existing Facilities and User Participation ................................................................................. 149
5.1.4 Societal Issues, Impact of Design as Politics .................................................... 151
5.2 Limitations and Suggestions for Future Research ............................................... 152
References ..................................................................................................................... 153

# APPENDIX A - OVERVIEW OF HEALTHCARE IN SINGAPORE ............ 155

The Beginnings of Nursing: 1800s ............................................................................ 155
Later Developments: 1900 – 1940 ............................................................................ 158
World War II to Self- Government: 1940s – 1958 ..................................................... 158
Self- Government: 1959 – 1965 ............................................................................... 161
Independence: 1965 – 2015 ..................................................................................... 162
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problems</td>
<td>162</td>
</tr>
<tr>
<td>Planning</td>
<td>163</td>
</tr>
<tr>
<td>Social Welfare and Public Healthcare Facilities and Public Housing</td>
<td>166</td>
</tr>
<tr>
<td>APPENDIX B - MINISTER FOR HEALTH GAN KIM YONG’S SPEECH 6TH AUGUST 2014</td>
<td>169</td>
</tr>
<tr>
<td>APPENDIX C - SUMMARY REPORT ON 9 EXISTING NURSING HOMES IN SINGAPORE</td>
<td>177</td>
</tr>
<tr>
<td>APPENDIX D - EXISTING GOVERNMENT-BUILT NURSING HOMES</td>
<td>187</td>
</tr>
<tr>
<td>REFEREED FULL PAPERS</td>
<td>191</td>
</tr>
<tr>
<td>PRESENTATIONS AT INTERNATIONAL CONFERENCES</td>
<td>191</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

Table 2-1 Method of Investigation .............................................................................................................. 21  
Table 2-2. The Care Staff Arrangement in Existing Facilities ................................................................. 26  
Table 2-3 Facility Standard and Effort Rule About Management ............................................................. 27  
Table 2-4 An Assumed Condition of Working Shift ................................................................................. 27  
Table 2-5 Number of Care Staff Attached to the Unit Calculated Based on Capacity per Unit and Care Staff ........................................................................................................... 28  
Table 2-6 Distribution of Unit Number Based ............................................................................................. 28  
Table 2-7 Method ....................................................................................................................................... 40  
Table 2-8 Attributes of Surveyed Hospitals .............................................................................................. 40  
Table 2-9 Patient Attributes ....................................................................................................................... 41  
Table 2-10 Posture Classification ............................................................................................................... 43  
Table 2-11 Behavior Classification ............................................................................................................ 43  
Table 2-12 Case 1 ....................................................................................................................................... 46  
Table 2-13 Case 2 ....................................................................................................................................... 46  
Table 2-14 Case 3 ....................................................................................................................................... 47  
Table 3-1 Functional Status and Care Needs of Patients under Different Nursing Care ................. 62  
Table 3-2 Outline of Nursing Homes in Singapore .................................................................................... 65  
Table 3-3 Outline of Studied 9 Facilities ...................................................................................................... 66  
Table 3-4 Facilities Composition ................................................................................................................. 67  
Table 3-5 Room Composition ..................................................................................................................... 69  
Table 3-6 POE on Common Space: Ramp, Dining Area, and Ward ......................................................... 72  
Table 3-7 Summary of the Points to Be Adopted and Avoided ................................................................. 74  
Table 4-1 Demand and Supply Projections ............................................................................................... 81  
Table 4-2 Vision of MOH/IMH for New Nursing Home .......................................................................... 83  
Table 4-3 Summary of Total Built-Up Area and Site Data ....................................................................... 84  
Table 4-4 Nursing Daily Activities and Work Flow .................................................................................. 97  
Table 4-5 Patient Workflow and Movement to Dining Area .................................................................... 98  
Table 4-6 Summary of Facilities Needed .................................................................................................. 104  
Table 4-7 Finalized Design Parameters .................................................................................................... 104
<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-8</td>
<td>Ways to Get On and Off Between Each Floor</td>
<td>121</td>
</tr>
<tr>
<td>4-9</td>
<td>Required Time for the 7 Options</td>
<td>125</td>
</tr>
<tr>
<td>4-10</td>
<td>Walking Distance from Northern Ward to Dining Hall</td>
<td>125</td>
</tr>
<tr>
<td>4-11</td>
<td>Milestone Dates</td>
<td>127</td>
</tr>
<tr>
<td>4-12</td>
<td>Design Stage</td>
<td>127</td>
</tr>
<tr>
<td>4-13</td>
<td>Tender Stage</td>
<td>129</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 1-1 A Spartan Ward of the Old Tan Tock Seng Hospital with the Patients, Beds and the Male Nurse.................................................................2
Figure 1-2 Modern 8-Bedded Ward with Shared Bathroom Facilities and Amenities in National University Hospital, Singapore ....................................................2
Figure 1-3 Graphic Presentation of the Key Points: -Career Development, Autonomy, Education and Recognition .................................................................8
Figure 1-4 Post-Occupancy Evaluation (POE) Process Model ........................................11
Figure 1-5 Holistic Evaluation Levelling on Performance (HELP) Model ................................13
Figure 2-1 Composition of Unit-Type Nursing Home .........................................................20
Figure 2-2 Ratio of Each Space in Architectural Area per Person ........................................22
Figure 2-3 Ratio of Providing Utilities Accompanying Private Room ..................................22
Figure 2-4 Ratio of Units Based on the Relationship between Common Living and Private Room .................................................................23
Figure 2-5 Average of Common Living Area Based on Each Sub-Type .................................25
Figure 2-6 Type Based on Distance among Units and Ratio of Them ..................................25
Figure 2-7 Public Space Area per Person Based on Distance among Units ............................26
Figure 2-8 Capacity per Unit Based on Distance among Units ...........................................26
Figure 2-9 Single Bed Room vs Multiple Bed Room ...........................................................31
Figure 2-10 Suggestion to Make Two Inconsistent Ideas Possible in Japan .........................31
Figure 2-11 Privacy Oriented Multiple Bed Room .............................................................31
Figure 2-12 Single Rooms with Multiple Bed Room ..........................................................32
Figure 2-13 An Ideal Type about Relation Between Privacy and Communication ................32
Figure 2-14 A Plan of Investigation Object .....................................................................33
Figure 2-15 A Ratio of Taking the Belongings ....................................................................33
Figure 2-16 Relation between Posture and Action of Inpatients ..........................................33
Figure 2-17 Example of Adjusting Interpersonal Relationship ...........................................34
Figure 2-18 Research Outline .........................................................................................35
Figure 2-19 Bringing Personal Articles ............................................................................36
Figure 2-20 Presence of Exchange and Mutual Aid Experience of Patient .........................37
Figure 2-21 Ratio of Posture and Act ..............................................................................37
Figure 2-22 Relation between Posture and Act ..........................................................37
Figure 2-23 Situation with Useful Mutual Aid..........................................................38
Figure 2-24 Reason for Curtain Opening and Shutting of Patient............................38
Figure 2-25 Attitude to Mutual Aid.................................................................38
Figure 2-26 Hospital K (Ward Plan)........................................................................41
Figure 2-27 Hospital K (Bed Room Plan) .................................................................41
Figure 2-28 Hospital Y Ward Plan ............................................................................41
Figure 2-29 Hospital Y Bed Room Plan .................................................................41
Figure 2-30 Hospital Y Interior Elevation ................................................................41
Figure 2-31 Ratio of Whereabouts ............................................................................42
Figure 2-32 Ratio of Postures ..................................................................................43
Figure 2-33 Hospital K Relation between Postures and Behaviors..........................44
Figure 2-34 Hospital Y Relation between Postures and Behaviors..........................44
Figure 2-35 Materials on Desk 1 .............................................................................45
Figure 2-36 Materials on Desk 2 .............................................................................46
Figure 2-37 Materials on Desk 3 .............................................................................47
Figure 3-1 Typical Floor Plans of Selected 9 Facilities.............................................66
Figure 3-2 Absence of Air-Conditioned Environment and Partition (N1) ...............71
Figure 3-3 Good Quality Dining Cum Day Space (N3) ............................................71
Figure 3-4 Dining Hall Cum Multi-Purpose Hall (W1) .............................................71
Figure 3-5 Spacious Area not utilized by the Use of Substandard Hospital Beds (P2)....71
Figure 3-6 Storage Furniture and Property (N2) ......................................................71
Figure 3-7 1.2 Meters, 1:12 Ramp In P2 – Covered Ramp – Located Too Close to Main
Lobby/Public Lift ..................................................................................................73
Figure 3-8 1.9 Meters, 1:12 Ramp in R2 with No Roof .........................................73
Figure 3-9 Dining Area in P2 – Segregated Male-Female in Dining Area – Different Dinning
Hours ..................................................................................................................73
Figure 3-10 Cross-Ventilated Dining – Day Space in R2 – Flexy Arrangement for
Multifunctional Usage ......................................................................................73
Figure 4-1 Proposed Residents’ Mix .......................................................................82
Figure 4-2 The Site of the New 300 Bedded 7-Storey Psychiatric Nursing Home ....83
Figure 4-3 Design Process of the New Nursing Home .........................................89
Figure 4-4 3 Preliminary Schematic Approaches ....................................................93
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-5</td>
<td>Concept - 4 Options</td>
<td>94</td>
</tr>
<tr>
<td>4-6</td>
<td>Preliminary Concept Design 2</td>
<td>95</td>
</tr>
<tr>
<td>4-7</td>
<td>Team of ‘Process Preparation’ Participants and Professional Consultants</td>
<td>96</td>
</tr>
<tr>
<td>4-8</td>
<td>Study Plan 1</td>
<td>99</td>
</tr>
<tr>
<td>4-9</td>
<td>Study Plan 2</td>
<td>100</td>
</tr>
<tr>
<td>4-10</td>
<td>Study Plan 3</td>
<td>101</td>
</tr>
<tr>
<td>4-11</td>
<td>Study Plan 4</td>
<td>102</td>
</tr>
<tr>
<td>4-12</td>
<td>Resident’s Mix and the Ramp</td>
<td>106</td>
</tr>
<tr>
<td>4-13</td>
<td>Preliminary Concept Design 3 Option1</td>
<td>108</td>
</tr>
<tr>
<td>4-14</td>
<td>Preliminary Concept Design 3 Option 1</td>
<td>110</td>
</tr>
<tr>
<td>4-15</td>
<td>Preliminary Concept Design 3 Option 2</td>
<td>110</td>
</tr>
<tr>
<td>4-16</td>
<td>Preliminary Concept Design 4</td>
<td>111</td>
</tr>
<tr>
<td>4-17</td>
<td>Preliminary Concept Design 5</td>
<td>112</td>
</tr>
<tr>
<td>4-18</td>
<td>Adopted Design, part 1/2</td>
<td>114</td>
</tr>
<tr>
<td>4-19</td>
<td>Adopted Design, part 2/2</td>
<td>115</td>
</tr>
<tr>
<td>4-20</td>
<td>Proposed Typical Ward Layout Consisting of 6 Beds per Cluster</td>
<td>116</td>
</tr>
<tr>
<td>4-21</td>
<td>2 to 5 Beds Configurations</td>
<td>116</td>
</tr>
<tr>
<td>4-22</td>
<td>View of Nursing Station along Passageway</td>
<td>117</td>
</tr>
<tr>
<td>4-23</td>
<td>View of Typical Ward</td>
<td>117</td>
</tr>
<tr>
<td>4-24</td>
<td>Healing Garden</td>
<td>118</td>
</tr>
<tr>
<td>4-25</td>
<td>Interior Perspective of Ramp</td>
<td>119</td>
</tr>
<tr>
<td>4-26</td>
<td>Exterior Perspective of Ramp</td>
<td>119</td>
</tr>
<tr>
<td>4-27</td>
<td>Section of Ramp</td>
<td>120</td>
</tr>
<tr>
<td>4-28</td>
<td>Ramp Benefits</td>
<td>121</td>
</tr>
<tr>
<td>4-29</td>
<td>The Flow Line of Residents</td>
<td>123</td>
</tr>
<tr>
<td>4-30</td>
<td>5 Residents Can Use the Staircase per Floor at the Same Time</td>
<td>124</td>
</tr>
<tr>
<td>4-31</td>
<td>38 Residents Can Use the Ramp per Floor at the Same Time.</td>
<td>124</td>
</tr>
<tr>
<td>4-32</td>
<td>Capacity of each Lift</td>
<td>125</td>
</tr>
<tr>
<td>4-33</td>
<td>Tender Stage Organization Chart for New Psychiatric Nursing Home</td>
<td>132</td>
</tr>
<tr>
<td>4-34</td>
<td>Post Tender Stage Organization Chart for New Psychiatric Nursing Home</td>
<td>133</td>
</tr>
<tr>
<td>4-35</td>
<td>Completed Psychiatric Nursing Home</td>
<td>133</td>
</tr>
<tr>
<td>5-1</td>
<td>Ward Layout Consisting of 6 Beds per Cluster</td>
<td>140</td>
</tr>
<tr>
<td>5-2</td>
<td>Section - Dining Hall Located on the Middle Floor</td>
<td>147</td>
</tr>
<tr>
<td>5-3</td>
<td>External View of 6-Storey Ramp</td>
<td>148</td>
</tr>
</tbody>
</table>
Figure 5-4 Healing Garden ........................................................................................................148

Figure A-1 Left: Children Receiving Medical Treatment from a Mobile Dispensary in 1951
Right: Nurses Visiting a Village in 1957 to Carry Out an Inoculation Exercise....................160
The best built-environment is a living space that serves the activities of the users in various climatic conditions, culture, needs, wants, expectations, ways of living and their hopes and dreams. In the real world it is an ideal when it is completed within cost, in time and the expected excellence.

The pursuit of real issues related to the built-environment of public nursing home is only achievable if full awareness is given to the parameters that determine its final outcome.

The Japanese occupation of Singapore (1942-1945) impacted my education. I started English schooling at Primary 2 then moved to Primary 4. Subsequently I completed Senior Cambridge in 1956 at the age of 16 years old. Thus, the perspectives of the parameters in this instance are shaped by an East - West sensibility of an oriental person with a western education.

I started my career as an architectural draftsman and graduated in 1965 upon completion of the 7-year Part-Time Day-Release Professional Diploma in Architecture from Singapore Polytechnic. Immediately upon obtaining the Practice’s registration in 1967, I commenced Private Practice (SKChan Architect/ADG Architect to DEG Architects/DEG LLP) in Singapore and in Malaysia 1971(DEG Akiteks to SKChan Akitek) respectively. I obtained the Master’s degree in Science (International Construction Management) from the Nanyang Technological University in 1997 on my thesis ‘Cost, Time and Quality Aspects of Primary Schools in Singapore’.

Singapore’s Independence in 1965 and its Industrialization Program in the late 60s and early 70s provided challenges to the many aspiring locally and overseas’ trained professionals in the built-environment.

The firm was reorganized in the late 70’s to DEG Architects soon after it won the prestigious start-up project of a multinational micro-electronic organization. The long and fruitful association of 35 plus years with the organization and its several top management personnel, tutored me to appreciate the maxim ‘good clients produce good built-environments’. Concurrently, projects of several building types were obtained through direct appointment and several commissions through open and limited competitions.
I also had the good fortune and privilege in the early 80’s to have discussions, collaborations and associations with Ron Herron and Prof. Kenzo Tange. Both made me more aware of the importance of continual education. Competency in practice and in academia is the necessary attributes of a professional in the practice of exemplary Architecture.

During the 90’s with the means, opportunity and encouragement derived from the practice I actively visited several countries and met many fellow Architects and allied Professionals. I benefited from the numerous discussions and gained good knowledge with attendance of many seminars and conferences.

Auspiciously, in the late 90’s I renewed my association with Prof. Akikazu Kato (whom I worked with in the early 80’s) and participated together in several local and international competitions. In 2011 with Prof. Kato’s contribution we won the design competition for the 7-storey 300-bedded Psychiatric Nursing Home organized by the Singapore Ministry of Health and Institute of Mental Health.

With the encouragement of Prof. Kato, I decided to pursue the doctoral study on ‘Planning, Design and Management of Public Nursing Home in Singapore’ with the objective to seek the ‘truth’ in healthcare built-environment. The doctoral thesis hopes to validate its achievements as well as to highlight the many issues that could have been avoided and handled differently.
STRUCTURE OF THE STUDY

This thesis is organized to illustrate and demonstrate the pursuit of real issues related to healthcare built-environment into Five Chapters.

Chapter 1 - Introduction

The overview of Singapore’s healthcare and public healthcare facilities, from 1800s to Self-Government in 1963 and Independence in 1965 until the 50 years of Independence in 2015 sets the background for the better understanding of the actual built-environment.

Chapter 2 - Aspects of Nursing Homes and Hospitals in Japan

Detailed analysis and study of key aspects of Japan’s respective nursing homes and hospitals, provides the knowledge of the materials and issues that impact the healthcare built-environment and as added tools to address the issues of context, demand, location and need of nursing homes in Singapore.

Chapter 3 - Existing Public Nursing Homes in Singapore

The survey enabled understanding the common features of facilities composition and room layouts of selected welfare residence facilities in Singapore. It provides beneficial feedbacks that can help in developing effective and meaningful built environment of welfare facilities in Singapore.

Chapter 4 - Case Study Of the New 300-Bedded 7-Storey High-Rise Psychiatric Nursing Home

Case Study of the New 300-bedded 7-storey high-rise psychiatric nursing home, covering design and management process. It records the efforts made through trail and tribulation to achieve higher excellence.

Chapter 5 - Conclusion and recommendations

Documentations of all the findings and contributions within each governing parameter of the nursing homes. Observation and appraisal of ‘Myth or Magic’ and ‘Affordable Excellence’ on Built-Environment of Singapore Healthcare System.
CHAPTER 1
INTRODUCTION

‘Subsidies on consumption are wrong and ruinous... for however wealthy a nation, it cannot carry health, unemployment and pension benefits without massive taxation and overloading the system, reducing the incentives to work and to save and care for one’s family - get addicted and the withdrawal of welfare benefit is very painful. (1981)

‘When people gets equal handouts, whether or not they work harder or better, everybody then works less hard......when people are encouraged to excel ......the society as a whole becomes wealthier and everyone thrives and prospers.’ (1984)

‘First’ we give everyone basic health care. Second, we have different grades of health care for those who want more than the basic. We have achieved what is fair health care for everybody, not equal health care, but fair and practical. We are not equal, we do not eat equal food, how can we demand equal medicine? (1995)

Lee Kuan Yew

1.1 Background
Lee Kuan Yew, in 1981, 1984 and 1995 respectively made three of his most pragmatic statements on welfare state and healthcare facilities. These have had significant impacts on the planning, design and management of public nursing homes in Singapore.

Fortuitously, since Independence in 1965, Singapore had a continuous Government with dedicated Ministers and civil servants to plan, design and develop the much needed healthcare system and facilities despite the reality that the Minister for Health at that time, Yong Nyuk Lin (1967) stated clearly and bluntly: “Health would rank, at the most, fifth in order of priority” for public funds.
Since 1965, Singapore and its people worked itself from third world to first world status (and means). This contributed substantially to the good fortune of all Singaporeans especially to those of lower income and means.

Today, it is timely for re-designing hospitals and stand-alone nursing homes for the future. Asian developing countries can avoid making the health care mistakes which the West is now trying to reverse. It is important to discard traditional tertiary care models and develop new ones. Reorganizing the new need of regional health systems hospitals and nursing homes,

**Figure 1-1** A Spartan Ward of the Old Tan Tock Seng Hospital with the Patients, Beds and the Male Nurse (Courtesy Of National Archives of Singapore)

**Figure 1-2** Modern 8-Bedded Ward with Shared Bathroom Facilities and Amenities in National University Hospital, Singapore
Singapore starts to carve the existing facilities up into acute, sub-acute, convalescent and community divisions in determined efforts to meet the situation.

It sponsors the Holistic Development of the Health System and the Financing considerations, relative to the preponderance in urban settings, to the concerns of worsening inequities between rich and poor. It is also relative to ’holistic population’ and ‘patient-centric design’ needs while it makes efforts to regularly review and improve upon them. Finally, it acknowledges that adroit use of financial incentives can be a powerful mechanism to encourage cost-saving by both patients and providers.

The broad goal of this research is to seek the ‘truth’ in healthcare built-environment and especially in public nursing homes. Public nursing home like ‘hospital must continue to evolve to be cost-effective, technologically adaptable, culturally acceptable and environmentally sustainable, synergistic with the broader continuum of care to serve the changing needs...’ (Dr Lim & A/P Phua, 2011)

The study is to investigate and seek solutions on healthcare built-environment of public nursing home - the ‘hardware’ to complement, support and help those who are responsible for the healthcare services - the ‘software. The process is to document the requirements from various stakeholders, i.e. from the paymaster, the different user groups and the technical authorities; the specific concerns regarding sense of control, access to social supports, access to positive distractions, and avoidance of exposure to negative distractions. The aim of this is to:

First, through Building Performance Evaluation process on facility management, result in a better built environment including the outdoor common place and dining facilities that corresponds to the changed life style and the needs of its different users.

Second, help to achieve a better understanding of the impact / issues of high rise developments and the differences of different types of homes within a multi-cultural / social and religious society for decision makers.

Third, to ascertain relevant, appropriate and useful conclusions (in advance) to advance, improve and achieve better informed assumptions and ultimately to better solutions for Public Healthcare facilities.
1.2 Overview of Healthcare in Singapore

The overview on the historical background of Singapore’s nurse, nursing and the healthcare facilities provide a clear understanding of the trails and tribulations that were experienced from the early 19th century until Singapore’s Independence in 1965, and from then until the celebration of 50 years of Independence in 2015. Appendix A is the full overview, taken from the book “A History of Modern Singapore, 1819-2005” by Turnbull, C. M. It is written in chronological order and extracted in verbatim to ensure the factual circumstances of the exact built environment are correctly presented.

This narration of Singapore’s humble healthcare facilities from 19th century to its present capabilities, during its period from third world to first world status is for all to understand its achievements and shortcomings. It hopes to provide for all to note the importance of having an appropriate and useful healthcare built environment in sync with a responsible Government as it also consumes a significant part of the total expenditure for the provision, construction and maintenance of healthcare services and its facilities.

1.2.1 Colonial Era until Independence

British colonized Singapore in 1819. Western healthcare was largely provided for the small group of European settlers and the British Administrators stationed in Singapore, and the local communities were excluded. Medical services were strictly segregated along economic and social status. Later, as Singapore became more commercially significant, more people arrived to trade and to seek better prospects. This grew an urgent need to provide more medical facilities. Western Healthcare including medicine was introduced to the general population by the British as socialization and legitimizing colonization to benefit the locals and to maintain the good health of the new added work-force to perform the tasks properly.

However, there were no local physicians and the medical staff was made up of military personnel. The main challenge was to recruit qualified staff – a problem the profession would continue to face in the decades to come. The fully occupied apothecaries, orderlies and dressers had to cover “nursing” duties in addition to their own work. As the female population increased and hospitals began admitting women, requests for female careers arose. Only after the 1850’s, did women go to give birth in a hospital.

Although the inclusion of British trained professional nurses had been suggested, it would be difficult to recruit such nurses to work in Singapore. In January 1867, the colonial
administration approved the request for a female attendant. The heavy workload of Singapore’s very first female “nurse”, having to run between two premises, and earning a measly monthly wage was a significant event in Singapore’s nursing history. It marked the first time a female employee was employed in the Medical Department.

The 1883, it was proposed to train the French nuns from the Convent of the Holy Infant Jesus – viewed as the only educated and qualified European women in Singapore then – who were prepared to undertake this selfless work. The proposal was immediately met with objections by some segments of the public. The government went ahead and the nuns began their nursing duties at the General Hospital on 1 August 1885. The date officially marks the beginnings of nursing in Singapore.

In 1908, the infant mortality rate was 347.8 per one thousand live births, with almost 60 percent of deaths occurring during the first three months of birth. The rising concerns over the high infant mortality rate, led to the start of a regular midwifery course for local women in 1910. That year marked the beginning of the Maternal and Child Health Service. To give a sense of how far we have come, Singapore’s infant mortality rate in 2015 was 1.7 per one thousand live births.

World War I broke out in July 1914 and many British nurses volunteered for service in the Armed Forces in England. This put a severe strain on the existing nursing staff in Singapore, and it became extremely difficult to find their replacements.

During the outbreak of World War II and the fall of Singapore on 15 February 1942, nurses were allowed to leave the hospitals. Those who opted to remain were transferred to the Mental Hospital. After the Japanese left, the British Military Administration faced the enormous yet urgent task of primary healthcare. A 10-year Medical Plan to improve Singapore’s health and medical services approved in 1948, with existing hospitals expanded and modernized, while many new outpatient clinics, maternal and child and infant welfare clinics were built.

In the meantime, a Nursing Ordinance came into force in 1949 to regulate the registration, training and professional discipline of nurses, while a Medical Registration Ordinance was enacted in 1953, making houseman-ship compulsory for doctors.

In January 1947, the government promoted locally trained nurses to the rank of Sister, creating opportunities for them to rise to supervisory and administrative posts. The recruitment of
student nurses was still abysmal mainly due to the lack of local women with the required level of education. To ease the shortage, nurse training for males was introduced in 1948. The early 1950’s saw recruitment efforts being ramped up, with better prospects, training and promotion opportunities for nurses. Nursing was also portrayed in the media as a respectable career. The marketing efforts paid off and the number of student nurses grew considerably.

The new School of Nursing, managed by the Singapore General Hospital, opened at Sepoy Lines in 1956. The increase in the number of nurses led to the need and necessity to both document and implement proper nursing procedures. In 1959, the first Handbook on Nursing Procedures was published and saw great strides being made to raise the status of nursing in Singapore.

Singapore attained self-government in 1959. The People Action Party (PAP) through its party’s professed policies founded on principle, not opportunism and with its constructive program of incorruptibility of economic and social reform began to work systematically on all areas of human endeavors including the problems of health. Notwithstanding, its inherited host of public health problems of high population growth, overcrowding, urgent industrialization program, poor food hygiene, vector-borne diseases and poor sanitation greatly taxed the ability of the Government.

1.2.2 Post Independence

Singapore’s First Government after Independence in 1965 was led by the then Prime Minister Lee Kuan Yew. Acknowledging the hosts of problems, the government adopted a pragmatic political approach to programming, planning and designing. Health would rank, at the most, fifth in order of priority for public funds. Nevertheless, the government planned primary care services closer to the people by developing a network of satellite outpatients dispensaries and maternal and child health clinics. These outpatient clinics were subsequently consolidated into modern polyclinics, small, well equipped medical-centers. When the government was made aware of the substantial increase in the outpatient attendance on the introduction of western medicine, introduced co-payment gradually to minimize the financial burden to the state and to deepen the sense of value to the people for its use of the service and the medicine. It also championed immunization and continue the unrelenting fight against familiar diseases like cholera, polio, malaria and smallpox.
In 1983, upon achieving a level of military and economic stability it issued a White Paper declaring its healthcare goals, including keeping care affordable, meeting the demands of a growing population, and managing the rising expectations of an increasing affluent society and meeting the demand for the increased care for the rapidly ageing population. In time it began to focus on disease prevention through a healthy lifestyle – including exercise, eating healthy, managing stress, stopping smoking. Furthermore, Singapore’s Medisave mooted in 1970’s was enacted through the Medisave Act of 1983 which is a further emphasis on” healthcare being an individual responsibility”. After years of studying on the strength and weakness of subsidies and Medisave, Medishield was introduced into the healthcare lexicon in 1990 a risk-sharing model for financially demanding hospitalizations.

The goal of the restructuring of its public hospitals was to allow the public hospitals to compete against one another. The public hospitals were given a free hand to implement management practices for improving effectiveness and efficiency, and much more freedom in their decisions regarding staffing, compensation, deployment of resources, and some user fees.

The Government blueprint for a modern healthcare system began by the early 1990’s. It recognized that healthcare costs were growing at an alarming rate that would soon put an unacceptable strain on the nation's as well as family finances. Its Ministerial Committee reviewed the role the government could play in containing costs, controlling subsidies, and ensuring the continued quality of care. The White Paper (1993) “Affordable Health Care” stated the Government's philosophy and approach in five fundamental objectives:

A. Promote Good Health.
B. Promote Individual Responsibility.
C. Ensure Basic Medical Services for All Singaporean.
D. Engage Competition and Market Forces.
E. Intervene Directly in the Healthcare Sector.

1.2.3 Nursing Profession
Since Independence in 1965, the government has made every effort to encourage the recruitment of women and men to a nursing career. Nursing is defined as a profession that touches the lives of many at the point of care of the sick and infirmed. In addition, nurses can choose to perform clinical, management, education, an academic and research career; and can
be a part of lifelong meaningful profession and opportunities to serve and care for your fellow men, women and children.

Ministry of Health (MOH) set up a National Nursing Taskforce in December 2012 to review and recommend ways to strengthen the development of the nursing profession. Their recommendations are in four key areas – (i) Career Development, (ii) Autonomy, (iii) Recognition and (iv) Education or “CARE” in short. The “CARE” program is to strengthen the development of the nursing profession and empower nurses to take on expanded roles.

Minister for Health Gan Kim Yong on 6th August 2014 announced the acceptance of these recommendations by MOH at the Nurses' Merit Award Ceremony with emphasizing in the importance of nurses. (Refer to APPENDIX B for Minister for Health Gan Kim Yong’s speech 6th August 2014)

The Government’s efforts through ‘CARE’ are consistent with its pragmatic on-going plan to develop and institute measures to meet the demands and needs of a fast aging population. The Healthcare 2020 masterplan is to meet the growing demand for healthcare needs arising from an ageing population and the introduction of Medishield Life enhances the affordability of healthcare for all Singaporeans. The Intermediate and Long Term Care (ILTC) sector is also needed to support an ageing population. Nurses, equipped with higher skills and knowledge, play an important role in transforming Singapore’s healthcare system.

Figure 1-3 Graphic Presentation of the Key Points:-Career Development, Autonomy, Education & Recognition (Courtesy Of Ministry Of Health)
1.2.4 Social Welfare

Today, Singapore's population enjoys one of the highest health levels in all of Southeast Asia largely attributed to good housing, sanitation, and water supply. Fully 100% of the population had access to safe drinking water and 99% had adequate sanitation in 1994–95. There are 19 hospitals, five of which were administered by the government, and five were "government restructured." The remaining nine hospitals are privately run. Life expectancy in 2005 was 81.62 years. That year, the infant mortality was 2.29 per 1,000 live births, the lowest in the world.

Nevertheless, the social problems of aging society is becoming serious in Singapore. In 2016, senior citizens (aged 65 and above) in Singapore formed 13.7% of the total population. The median age of the citizen population is 41.0 years (NPTD, 2016). These figures rose from 9.2% and 37.0 years respectively, 10 years ago (2006). The high rates of aging are attributed to the lower fertility rates as a consequence of the application of population control policies of 1960 and 1980, in addition an increase in the average life expectancy.

Singapore does not regard itself as a welfare state. It does not subscribe to welfare, which as practice in welfare states (such as Britain and Sweden) have undermined self-reliance. Singapore’s subscribes to a paternalistic approach of social order and responsibility. In contrast with the welfare states, ‘for a resource-poor country like Singapore, hard work, and high performance amply rewarded, is the best way to attract capital and technology into the country to generate wealth.’ (Lee K. Y., 1978)

It provides a social protection model which can be loosely referred to as the ‘Confucian’ welfare model, with emphasis on individual and family self-reliance and on community support welfare on public housing and health care. Singapore demands social responsibility of individual, its family and the community.

Singapore’s current targeted welfare program and social policy are in health and housing, taking 29.6% of Social Expenditure for 2008. Its vision of housing is primarily elderly-friendly, one that allows and encourages older persons to live as part of the family in a comprehensive range of housing options and when circumstances dedicate that seniors have to live in community, good welfare supported Healthcare services are provided.
1.3 Objectives

The study is to document the process of establishing the requirements from various stakeholders, the different user groups and the technical authorities. Specific concerns regarding sense of control, access to social supports, access to positive distractions, and lack of exposure to negative distractions important issues for residents are also to be identified and addressed. In accordance with the goals, the study objectives are to provide proper, efficient and desired answers on how:

A. to gain better results in a better built environment that corresponds to the changed life style and the needs of its different users, so to meet higher level on needs, wants and expectations

B. to achieve a better understanding of the impact and issues of high rise developments and meet the emergence of new generation of residential users,

C. to ascertain relevant, appropriate and useful conclusions to advance, improve and achieve better informed assumptions and ultimately to better solutions for Public Healthcare facilities through research, building performance evaluation of existing facilities and user participation in the planning and design process,

D. to meet the increased demand for nursing home, while addressing societal issues and the impact of design as politics on built environment that affect the planning, design and management of Public nursing homes.
1.4 Methodology

The generic frame of the study is a Holistic Approach, which is principally derived and based on the methodology and process enunciated in Assessing Building Performance (edited by Wolfgang F.E. Preiser and Jacqueline C. Vischer, 2005)

![Figure 1-4 Post-Occupancy Evaluation (POE) Process Model. Source: Assessing Building Performance, Preiser, W. F. E., Vischer J. C., (2005)](image)

Building Performance Evaluation is the process of systematically comparing the actual performance of buildings, places and systems to explicitly documented criteria for their expected performance. A sub-process of BPE, Post-Occupancy Evaluation (POE) can be defined as the act of evaluating buildings in a systematic and rigorous manner after they have been built and occupied for some time.

Several types of evaluations are made during the planning, programming, design, construction and occupancy phases of building delivery. They are often technical evaluations related to questions about materials, engineering or construction of a facility. POE addresses the needs, activities and goals of the people and organizations using a facility, including maintenance, building operations, and design-related questions. Also, it includes indices related to organizational and occupant performance, worker satisfaction and productivity, as well as the measures of building performance referred to above, e.g. acoustic and lighting levels, adequacy of space, spatial relationships, etc.
1. The BPE framework was developed in order to broaden the basis for POE feedback to include a wider range of stakeholders and decision makers who influence buildings.

2. The goal of BPE is to improve the quality of decisions made at every phase of the building life cycle, i.e. from strategic planning to programming, design and construction, all the way to facility management and adaptive reuse. Rather than waiting for the building to be occupied before evaluating building quality, early intervention helps avoid common mistakes caused by insufficient information and inadequate communication among building professionals at different stages.

3. POE is a useful tool in BPE as POE is made relevant earlier in the design process and applied throughout the building delivery and life cycle.

4. POE focused primarily on users' experience of the performance of buildings and recent evolution of POE towards building performance evaluation is one that emphasizes a holistic, process-oriented approach toward evaluation i.e review and feedback loops

Holistic Evaluation Levelling on Performance (HELP) model is based primarily on Presier’s Building Performance Evaluation and Post-Occupancy Evaluation Process Model. HELP combines BPE and POE concurrently with the needs, wants and expectations of key participants. It links the important and logical sequential progression from the assessment of built environment; as 'information feedback through continuous evaluation leads to better design assumptions and ultimately to better solutions' (Preiser, Vischer, 2005).

The need to secure an integrated multiple methods of investigation to obtain relevant data for establishment of a built environment within a multicultural, multi-social and multi-religious society, of functionality for different users and groups, to policy makers and operators for their agreement, acceptance and adoption on the needs, wants and expectations of the various parties and each type of end-users/participants, and ultimately a well-planned built environment with quality built within scheduled time and within the cost budget and value for money lead to the formulation of HELP. HELP process consists of 8 stages often in sequence to reach its goal:

1) Issues - Existing and/or Proposal
2) Focus
3) General - Formal and/or Informal
4) Data Gathering
5) Crystallization 1 - Theory, Research and Discourse
6) Crystallization 2 - Analysis, Statistics and Evaluation
The research adopts both the qualitative and quantitative methods of data collection to provide opportunities for examining different facets of the phenomena. This adds breadth and depth to the examination of the issues. The integrated multiple methods of investigation are to obtain relevant data for re-examination and establishment of:

- built environment for a multi-cultural, multi-social and multi-religious society,
- functionality for different users and groups,
- an illustration to policy makers and operators for their agreement, acceptance and adoption on the needs, wants and expectations of the various parties and each type of end-users/ participants,
- a well-planned built environment with quality built within scheduled time and within the cost budget and value for money

Qualitative data collection consists of on-site observations and in-depth focus group interviews and site visits with different users on various cases and completed projects. Quantitative data collection is from documents, plans and extracts from literature. Based on these, the study methodology includes:
• Building Performance Evaluation and Post Occupancy Evaluation which included visits to various types of homes to conduct interview of different levels of management/staff to establish in depth knowledge and records made of the conclusions and findings of the needs, wants and expectations of the users, caregivers and care-providers.

• Literatures, plans, and documents review and study to understand the background and the significance of various types of nursing homes in Singapore and overseas with emphasis given to existing types of nursing homes in operation since 2013, recently completed nursing homes and the differences of each types of homes.

• The new 300 bedded Psychiatric Nursing Home was studied in a similar manner from inception until completion within evidence based design approach.

1.5 Definitions
The following definitions used in this study are described in the Singapore context or as explained:-

**Public Nursing Homes** The elderly can be admitted in if they need daily skilled nursing care and/or assistance in activities of daily living and they have no caregiver to look after them at home. The elderly must be semi-ambulant, wheel-chair bound or bed bound. Elderly sick with medical conditions, e.g. stroke, diabetes mellitus with complications, head or spinal injury etc., and who require nursing care, are eligible for nursing home care.

The public nursing homes provide a range of services to meet the needs of the residents. The services include medical care, nursing care, physiotherapy, dietary services and dental care. Some homes provide care for persons with special needs like dementia and persons with stabilized psychiatric conditions. Respite care is also available at some of the (public) nursing homes where provision for short-term care of a few weeks can be arranged.

Public is the adjective placed before Nursing Homes to differentiate it from Private Nursing Home. However, both are subjected to all relevant rules and regulations before each is issued with the mandatory nursing home license. Patients are free to choose the providers within the government or private healthcare delivery system and can walk in for a consultation at any private clinic or any government polyclinic. For emergency services, patients can go at any time to the 24-hour Accident & Emergency Departments located in the government hospitals.
Public Nursing Homes are funded partially under certain conditions by the Government. The other types of homes include private nursing homes, private nursing psychiatric homes, privately run nursing welfare homes and private residential nursing homes.

**Welfare**, in Singapore, the regime provides a social protection model which can be loosely referred to as the ‘Confucian’ welfare model, with emphasis on individual and family self-reliance and on community support welfare on public housing and health care.

**Post-Occupancy Evaluation (POE)**, involves systematic evaluation of opinion about buildings in use, from the perspective of the people who use them. It is the evaluation of the performance of buildings after they have been occupied. POE provides a mechanism for understanding the mutual interaction process between buildings and users’ needs and recommending ways of improving the environment necessary to accommodate the needs.

**Building performance evaluation (BPE)** is the process of evaluating the performance of a building at time with Post Occupancy Evaluation (POE) being one of its major parts. It can be carried out in new, existing and refurbished domestic and non-domestic buildings. It is based on feedback and evaluation at every phase of building delivery ranging from strategic planning to occupancy through the building’s life cycle.

**Evidence-based design (EBD)**. EBD’s main approach is to amass credible information and findings to support in the design of built environment. Especially in healthcare, it is to improve patients and/or residents and staff well-being, patients healing, stress reduction and safety in built environment.

**Scenario Based Design Team (SBDT)**, is using team’s efforts to provide a narrative, bounded or scoped, descriptive within a specified time-frame to achieve an updated given brief which is to be shared and analysis by the focus group and then design for decision by the promoter for its implementation. SBDT is structured at the commencement of the conceptualization of the built environment and through the duration of its implementation and completion. It consists of the Project Professional Team of key consultants lead by the Architect assisted by the Project Manager.

**1.6 Conclusion**

The historical review of Singapore’s healthcare and public healthcare facilities and its social environment sets the background for the better understanding of the actual built-environment.
in healthcare and nursing homes. Nursing homes, as part of the healthcare environment, face different priorities from different stakeholders such as government, public and caregivers. When designing such facilities, emphasis needs to be given on the context that drives these priorities.

For that reason, and prior to examining the nursing homes in Singapore, the study examines in Chapter 2 the context and key aspects of nursing homes and hospitals in Japan, a country with similar demographics with Singapore, but more advanced.
References


National Population and Talent Development Division (2012). *Projection of Manpower Demand for Healthcare Sector, Construction Workers and Foreign Domestic Workers*. Prime Minister’s Office, Singapore


CHAPTER 2

ASPECTS OF NURSING HOMES AND HOSPITALS IN JAPAN

Key aspects of Japan’s nursing homes and hospitals are studied as comparison with the respective homes in Singapore. Japan is facing similar demographic and ageing problems like Singapore. However, it is a more advanced country, economically and socially. Therefore, studying the Japanese respective facilities, offers valuable knowledge and tools for planning, design and management of nursing homes in Singapore.

2.1 Planning Characteristics in Unit-Type Nursing Homes

The study of planning characteristics in ‘Unit-Type Nursing Home’ (UTNH) delves into the current situation, analysis, problem solving, and results of Nursing Homes in Japan. It aims to clarify relations between the space planning and the care method, focusing on the results that have significant impact on planning of capacity and size.

2.1.1 Introduction

Compared with western countries, the rate of aging in Japan is quite rapid. Moreover, this rate of aging is far more rapid in the case of eastern and southeastern Asian countries- thus the need to present Japanese experience in international forums such as Environmental Design Research Association (edra) Japanese nursing homes for the elderly have changed dramatically in the last 20 years, and at present, the quality of the living environment is becoming the main issue. How can we improve the quality of nursing homes living environment? The study delves into the current situation, analysis, problem solving, and results.

Although homes for the aged in Japan started as early as 1963, the quality was very poor. Space design was poor and the places for residents were mostly composed of only a multi-bed room and a large-scale dining room. Furthermore, the residents were treated not as individuals but as a group. The 1990’s were the turning point in the planning and design of the homes for the aged in Japan. Most of the elderly began to think that privacy was important, which resulted in more individual settings, however their health conditions became more serious. In order to remedy some of the negative effects, some modifications were introduced on the design and management levels; the multiple-bed room was turned into a single room, and in order to realize
gradual space composition, a small-scale day room was provided near the single room. Moreover, the care philosophy was changed to respect every person's individuality, and individual care became the new motto of many nursing homes.

The Japanese government institutionalized the unit type nursing home (UTNH) in 2003. Institutionalization of group homes for the elderly with dementia had significant influence on the progress of the concept of unit care. Although the building policy plan implemented a home making in the establishment of institutionalization, a new problem arose. Before being institutionalized, the management side of UTNH, in collaboration with architects, was concerned with facilities planning as a positive measure to enable the performance of individual care. Moreover, in order to realize sufficient individual care, the management tried to assign more care staff (ratio of 2-2.25 residents to 1 staff), while the national standard recommends a ratio of (3:1).

After institutionalization, although detailed standards about the planning of space were established for UTNH, the standards for care provision methods were established only for good-faith efforts. The standards may realize an improved space; however, the care provided may remain conventional and collective care, creating a mismatch of expectation. Therefore, to achieve the goals of UTNH after institutionalization, and to guarantee that sufficient individual care is carried out, there is a need to reconsider the space planning to fit the management method.

2.1.2 The Characteristics of Unit-Type Nursing Homes

The composition of Unit-Type Nursing Homes (UTNH), with four hierarchies of space, is shown in Figure 2-1. Primarily, UTNH was divided into public space and the inside unit space; the inside unit space was divided into common space and private rooms. The public space was divided into an exchange space for the neighboring community and an exchange space for other units. In a typical unit, ten private rooms are provided in principle, together with a kitchen,
a dining room, a living space, and a bathroom. Moreover, it was made desirable for the care staff to exclusively serve one unit, however, two units were to be united during the night shift.

### 2.1.3 Research Objectives and Methodology

This research analyzes the overall tendency of plan composition of Unit-Type Nursing Homes (UTNH) (79 facilities), which applied for government funding in the first year after institutionalization. Through the case studies, the study aims at clarifying relations between the space planning and the care method.

An investigation outline is shown in Table 2-1. The tendency of habitation space and characteristics of spatial planning are explored through analysis of the overall facility plan and the individual unit plan in each facility. Next, care method has been studied in existing UTNH and the relation between a space plan and care method is clarified by the distance among units and the sharing of equipment. (Table 2-1)

#### Table 2-1 Method of Investigation

<table>
<thead>
<tr>
<th>Object</th>
<th>Unit-type nursing home applying a subsidy to the prefectures in 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>number of facilities</td>
<td>79 facilities</td>
</tr>
<tr>
<td>number of units</td>
<td>638 units</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Object</th>
<th>Questionnaire for Care Staff Arrangement</th>
</tr>
</thead>
<tbody>
<tr>
<td>number of facilities</td>
<td>existing Unit-type nursing home</td>
</tr>
<tr>
<td>number of facilities</td>
<td>4 facilities</td>
</tr>
</tbody>
</table>

#### 2.1.4 Analysis Results

- **Overall Plan**

The overall tendency analysis was based on area distribution. The average total capacity of each facility was 77.3 persons and the average of number of units was 8.1 units. The units of even numbers formed more than 80 percent of the whole. The average of the capacity of one unit was 9.6 persons; and units that consisted of ten or fewer persons formed 80 percent of the studied units. The ratio of architectural area is shown in Figure 2-2. The average per capita architectural area is 51.6 m², far exceeding the 34.13 m² standard of a former type facility. The ratio of per capita public space and inside unit space was 19.8 m²: 31.2 m², (39%: 61%). (Figure 2-2).
CHAPTER 2
ASPECTS OF NURSING HOMES AND HOSPITALS IN JAPAN

Planning of The Inside Unit

The inside unit space consists of private rooms and common space. The common space consists of a passage, a kitchen, a dining room, and a living space.

Private Room

The average size of a per capita private room was 15.1 m². Eighty percent of the private rooms which exceeded the national standard (13.2 m²) had an area of 14 to 18 m². The installation rate of utilities within private rooms is shown in Figure 2-3. The ratio of units which had a toilet in the private room was 32 percent, and the ratio of units which had a washstand in the private room was 86 percent.

The Relationship between Common Living and Private Room

Although the average common space area was 16.1 m² per person, common space area had large variations by unit. This is considered to be based on not only the difference of the common space area, but also a private room, a kitchen, a dining room, a living space, and the spatial relationship of what is called common living (CL). The relation of the private room and CL was investigated in more detail based on the independency of CL (Figure 2-4).
An "independent common living" type had a configuration where CL was independent of a passage; while a "dependent common living" type had a configuration where CL merges with a passage. Through studying the different available configurations, seven sub-types were identified: The analysis of the various types showed that "Independent common living type" configurations composed 36 percent, while the "Dependent common living type" composed 64 percent, clarifying a tendency to use dependent CL in most studied plans.

Looking at the sub-types, it was noticed that the "Central Corridor with Independent CL type" and the "Hall type" were more prominent in the studied plans (Figure 2-4). The "Plural CL type" had the maximum average area of common space per person with 19.2 m², while the minimum value of 14.8 m² belongs to the "Hall type". The average of the common space of "Independent common living type" was 17.0 m², and that of "Dependent common living type"

<table>
<thead>
<tr>
<th>Type</th>
<th>Sub Type</th>
<th>Diagram</th>
<th>Ratio of Units (actual number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent common living</td>
<td>Central Corridor with Independent CL</td>
<td><img src="image" alt="Diagram" /></td>
<td>24% (150)</td>
</tr>
<tr>
<td>Independent common living</td>
<td>Side Corridor with Independent CL</td>
<td><img src="image" alt="Diagram" /></td>
<td>4% (26)</td>
</tr>
<tr>
<td>Independent common living</td>
<td>Plural CL</td>
<td><img src="image" alt="Diagram" /></td>
<td>8% (54)</td>
</tr>
<tr>
<td>Dependent common living</td>
<td>L Shape Model</td>
<td><img src="image" alt="Diagram" /></td>
<td>20% (129)</td>
</tr>
<tr>
<td>Dependent common living</td>
<td>Hall</td>
<td><img src="image" alt="Diagram" /></td>
<td>34% (150)</td>
</tr>
<tr>
<td>Dependent common living</td>
<td>Wide Central Corridor</td>
<td><img src="image" alt="Diagram" /></td>
<td>15% (98)</td>
</tr>
<tr>
<td>Dependent common living</td>
<td>Wide Side Corridor</td>
<td><img src="image" alt="Diagram" /></td>
<td>5% (31)</td>
</tr>
</tbody>
</table>

**Figure 2-4 Ratio of Units Based on the Relationship between Common Living & Private Room**
was 15.3 m². It can be said that common space area of "Dependent common living type" was marginally smaller (Figure 2-5).

It may be noted that the construction costs may be contained in "Dependent common living type." However, it special composition may not provide for the serenity and calmness of residents accompanying an outside view. Therefore, it is important to balance the size of area and the quality of space.

- **Distance Among Units**

  Linking distance traveled to care method, the distance among units, the connection pattern, and the characteristics of planning measured by the distance among units were classified, and the relation between a space plan and care method were discerned.

- **Type Based on Distance Among Units and Ratios**

  The typology in three models based on distance among units and the connection pattern was carried out. Figure 2-5 shows the care unit to be expected.

  1. Cluster type: This is highly independent, and the traffic with other units is only through a designated entrance.

  2. Come and go type: The level of independence is of a moderate degree, and the traffic with other units is carried out through a passage or CL.

  3. Passage type: The level of independency is low, a passage flow line of other units is utilized, and frequent traffic is expected.

Further detailed analysis was performed revealing a total of six sub-types. The cluster type showed the largest recurrence and was used in 53 percent of facilities. Moreover, in breakdown category, the cluster separation sub-type was used in 43 percent of facilities.

Furthermore, from the same figure the relation between the distance among units and assumption of a care unit can be assumed. For example, Come and go type or Passage type units may share care among two or more units. However, Cluster type units with a long distance for travel among units may have to be cared for as an independent unit due to the difficulties of staff traffic. In the old nursing home models, because there was one care unit in the whole facility, such a problem did not appear. This may be a problem peculiar to UTNH.
Characteristics Based on type of Distance Among Units

The average area of public space per person, which appeared according to the distance among units, is shown in Figure 2-7. The Cluster type was the largest, with 20.9 m². The Come and go type was 20.1 m², while the Passage type was 18.0 m². It is thought that the area of a public space becomes larger when the distance among units is longer, resulting in a larger passage area (Figure 2-7).

**Figure 2-5** Average of Common Living Area Based on Each Sub-Type

**Figure 2-6** Type Based on Distance among Units and Ratio of Them

- Characteristics Based on type of Distance Among Units
The average capacity of one unit as measured by the distance among units is shown in Figure 8. Cluster type had a capacity of 10.1 persons, the Come and go type had 9.4 persons, and the Passage type had 8.4 persons. A tendency with smaller capacities is apparent when the distance among units is shorter (Figure 2-8).

2.1.5 How Consciously is Care Staff Arrangement Considered in Design of Floor Plans?

- The Care Staff Arrangement in Existing Facilities

This chapter considers the actual condition of the care method in the existing UTNH. The result is shown in Table 2-2. While the capacity per unit was 6 to 15 persons in each case, the care scale was 16 or more persons. Furthermore, the resident-staff ratio was higher (from 1.6 to 2.6:1) than the national standard of (3:1).

<table>
<thead>
<tr>
<th>facility name</th>
<th>Type Based on Distance Among Units</th>
<th>Capacity of Facility</th>
<th>number of care staff converted a full time employee</th>
<th>residents : care staff</th>
<th>Capacity Per Unit</th>
<th>Care Scale (Care Staff:Residents)</th>
<th>average number of night staff per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>P facility</td>
<td>Come and go Cluster CL connect</td>
<td>70 person</td>
<td>45.8</td>
<td>1.6 : 1</td>
<td>0 ~ 12 person</td>
<td>3.5-3.6/17-18</td>
<td>4/78</td>
</tr>
<tr>
<td>A facility</td>
<td>Cluster</td>
<td>70 person</td>
<td>36</td>
<td>1.9 : 1</td>
<td>9~15 person</td>
<td>13-13/10-36</td>
<td>3/76</td>
</tr>
<tr>
<td>S facility</td>
<td>Come and go Cluster bypass</td>
<td>100 person</td>
<td>45.7</td>
<td>2.2 : 1</td>
<td>8 person</td>
<td>3-13/16-32</td>
<td>4/100</td>
</tr>
<tr>
<td>H facility</td>
<td>Come and go Cluster CL connect</td>
<td>140</td>
<td>53.3</td>
<td>2.6 : 1</td>
<td>10 person</td>
<td>20/79/90</td>
<td>7/140</td>
</tr>
</tbody>
</table>

Table 2-2. The Care Staff Arrangement in Existing Facilities
Assumption of the Care Staff Arrangement by the Resident Versus Staff Ratio and Unit Capacity

The focal points of the management standard in UTNH are shown in Table 2-3. Although this management standard is an effort regulation and does not indicate "the essential staff under exclusive contract with a unit", the existing UTNH replied that "It is indispensable to consider the staff as under exclusive contract with a unit" (Table 2-3).

Furthermore, if there are staff who are in a unit in the daytime while the staff are engaged in a resident's continence care, nobody may be in a unit. Therefore, it is needed to assume that there are two or three staff in the daytime as well. Based on the above, an assumed condition of working shifts was drawn as Table 2-4.

<table>
<thead>
<tr>
<th>Number of Care Staff</th>
<th>Daytime: An Assumption That Care Staff of 1 Person(or 2,3) Usually Arranged in Each Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care Staff Arrangement</td>
<td>Night Care Staff of 1 Person Arranged Per 2 Units</td>
</tr>
<tr>
<td>Number of Night Shift</td>
<td>Care Staff Attached to The Unit</td>
</tr>
<tr>
<td></td>
<td>Within 6 Times Per a Month (Standard)</td>
</tr>
</tbody>
</table>

Table 2-3 Facility Standard and Effort Rule About Management

Based on the analysis of care method for the resident-staff ratio and the unit capacity in the studied 79 facilities (638 units) as seen in Table 2-5, a proposal of the possible number of staff which could be attached in any unit was put forward. Furthermore, a simulation of staff numbers was performed to check whether planning the working shift would meet the assumed condition of the working shift (Table 2-4) was possible (Table 2-5).

<table>
<thead>
<tr>
<th>Standard About Unit</th>
<th>The Capacity Per Unit Less Than 10 Person in principle</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(in case of 11 or 12, regarded as nearly 10)</td>
</tr>
<tr>
<td></td>
<td>(more than half unit in a facility)</td>
</tr>
<tr>
<td>Care Staff Arrangement</td>
<td>It is to be desired that there are care staffs more than a person every unit in daytime, more than a person per 2 unit in the night</td>
</tr>
</tbody>
</table>

Table 2-4 An Assumed Condition of Working Shift

In order for at least one staff member to provide care in a unit in the daytime, this requires the unit capacity to be a maximum of nine in cases where the resident-staff ratio is 3:1, if the ratio is 2.5:1, then the unit capacity is eight. When the ratio is 2:1, unless the unit capacity is six or more persons, it cannot be managed with one staff member. Furthermore, in order for two staff to exist in a unit in the daytime, it requires 14 persons by 3:1, 12 persons by 2.5:1, and 9 persons by 2:1, which are the requirements for unit capacity.

As mentioned above, in order to arrange two staff in a unit in the daytime, it is necessary to arrange many more staff than the national standard by self-reliance, or to construct a working
shift not in an independent unit, but in two or more units. The example is the facility designed considering a working shift in two units and three staff arrangement in a unit in the daytime as a premise. As a consequence, it turns out that an even number unit occupies not less than 80 percent of the whole, and above is closely related.

The distribution of a unit capacity and number of unit of cluster type in object facilities is shown in Table 2-6. The capacity per unit of ten or less persons, which is a national standard, forms 81 percent of the studied facilities, and Cluster type forms 33 percent (Table 2-6).

In the facilities which have this unit type, sufficient examination of staff arrangement is not carried out. Even the working shift by two or more units can’t be realized, because of the limits of unit capacities and the difficulty of traffic among units. The possibility is high that the staff will perform the group treatment as before in a situation of fewer staff.

![Table 2-5 Number of Care Staff Attached To the Unit Calculated Based on Capacity per Unit and Care Staff](image1)

![Table 2-6 Distribution of Unit Number Based](image2)
2.1.6 Conclusion

The analysis of Unit-Type Nursing Homes (UTNH) in 79 institutions enabled the clarification of the relations between space planning and care method. The average of a per capita gross floor area was 51.6 m$^2$, far larger than the standard of old nursing homes (34.13 m$^2$).

In relation to utilities attached with private rooms, washstands were installed in about 90 percent of private rooms, and toilet were installed in about 30 percent. As for the common space, it was assumed that the position of CL where the residents mainly spent time together and the private room has a relationship with the area of common space and lounge space.

Six types of classifications were clarified by the distance among units. Although the rate of the facility with the longer distance among units is highly independent was the highest, in some of the facilities with shorter distances among units, the floor planning could easily lead to collective care service, particularly in the units with passages enabling come and go through CL. If unit residents need to pass through other CL in order to reach their own unit, this plan's quality as a home-like environment needs to be questioned.

The spatial features of UTNH sharing utilities among units were 1) the distance among the units was short and they had less independence and 2) the unit capacity was smaller. With these facilities, it is assumed that the facilities create the staff's working shift not in a single unit but in two or more units. Therefore, in UTNH, it can be said that there is a very close relation between space composition and staffing method.

In the existing UTNH, the planning of life scale and that of care scale were carried out independently. When the staffing method was assumed following the condition of national standard and/or good faith effort regulation, it turned out that in order to allocate two staff persons in the daytime in the unit to enable effective individual care, the facility needed to allocate larger numbers of staff than that of the national standard or to configure staffing among two or more units rather than a single unit.

Space provision standards are provided in detail in the present UTNH system, yet the facility is responsible for the care method or service provision method. Therefore, an architect and manager need to cooperate to develop a plan. The realization of an individual care is attained only after the adoption of holistic planning. This report on the Japanese experience should serve other Asian nations expecting faster aging of their population and other nations with
similar demographic or care tendencies. Thus, there is a need for this information to be published and discussed in international forums such as edra.

### 2.2 Planning and Design Issues of Single Bed Room Inpatient Quarters

**Which is Better a Single Bed Room Versus a Multiple Bedroom in Hospital?**

In the 1990’s most of the elderly began to think that privacy was important, which resulted in settings that are more individual. In addition, the care philosophy was changed to respect every person’s individuality, and individual care became the new motto of many nursing homes.

As break-through from the dichotomy between single-bed rooms and multiple-bed rooms, privacy oriented multiple-bed room, where each patient will be provided with his/her private corner, have been designed in new hospitals since the 1990’s in Japan in response to call for the privacy provision of inpatients. Single rooms with multiple-bed room like arrangement are planned to shorten the walking distance of nurses; however, the privacy provision following the Euro-American value of life may lead to segregation of inpatients resulting in a lack of communication and jeopardizing the virtue of mutual aid among patients, a tradition of Japan and Asia.

The study focuses on a suitable balance between privacy and communication of inpatients to offer appropriate choices for every inpatient. The surveys were carried out to clarify the belongings and behavior inpatients to reveal the privacy requirements and on the patterns of communication requirements among inpatients. Consequently, suggestions are made to better resolve the controversial issue of privacy versus communication in the inpatient bed rooms.

#### 2.2.1 Discussion

- When merits of single-bed rooms are compared with those of multiple-bed rooms, the former provides more for the privacy, while the latter realizes easier observation and better efficiency in nursing. (Figure 2-9 and Figure 2-10)
- A small window is placed for each bed to provide for better view and airflow. The plan secures more privacy with a limited floor area. However, some are found with inadequate corridor space and minimum space between the beds. (Figure 2-11)
• A common space in the center of pod plan provides for recording work in nursing and communication among patients. The floor area for central common space is realized area in welfare housing facilities for the elderly. (Figure 2-12)

• An ideal healing environment may provide for a suitable balance between contradictory privacy and communications, and secures adequate choice for all patients. (Figure 2-13)

![Figure 2-7 Single Bed Room vs Multiple Bed Room](image)

![Figure 2-8 Suggestion to Make Two Inconsistent Ideas Possible in Japan](image)

![Figure 2-9 Privacy Oriented Multiple Bed Room](image)
2.2.2 Survey and Result

- Surveyed items in Hospitals Recordings of carry-on items and their placements. Patients’ activities in day time. (Figure 2-14)

- Personal carry-on items are mostly ruled by the hospital management, and large items such as furniture and those signifying identities of patients are scarce. However, cellular phones are brought in by about 60% of patients. (Figure 2-15)

- Most patients tended to lie down on their beds. However, various living activities were carried out in that position. A physical environment design to afford for various patient positions is required to provide for communications and to enhance quicker recovery. (Figure 2-16)
Some patients place their beds closer for easier communication. A system should be made to freely place patient beds. (Figure 2-17)

![Figure 2-12 A Plan of Investigation Object](image1)

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>from 90%</td>
<td>towel, tissues</td>
</tr>
<tr>
<td>from 80%</td>
<td>toothbrush, underwear, slippers, etc.</td>
</tr>
<tr>
<td>from 70%</td>
<td>cup, chopstick, bath towel, wallet, etc.</td>
</tr>
<tr>
<td>from 60%</td>
<td>pen, clothes, plastic bag, cell phone, etc.</td>
</tr>
<tr>
<td>from 50%</td>
<td>glasses, medicine, calendar, hair brush, etc.</td>
</tr>
<tr>
<td>from 40%</td>
<td>clock, overnight bag, magazine, beverage</td>
</tr>
<tr>
<td>from 30%</td>
<td>hanger, soap, newspaper, handbag</td>
</tr>
<tr>
<td>from 20%</td>
<td>small kettle, confectionery, radio, paper diaper, book, textbook, fruit, cushion, etc.</td>
</tr>
<tr>
<td>from 10%</td>
<td>notebook, box, cotton mask, scissors, shelf, desk lamp, portable toilet, portable audio player</td>
</tr>
</tbody>
</table>

![Figure 2-13 A Ratio of Taking the Belongings](image2)

![Figure 2-14 Relation between Posture and Action of Inpatients](image3)
2.2.3 Conclusion
Consequently, following suggestions are made to better resolve the controversial issue of privacy versus communication;

1. The management system and environmental design should be realized to support the free and natural occurrence of communication among inpatients.

2. It is important to furnish and implement the adjustments of interpersonal relationships among inpatients and also to reduce unnecessary heavy rules among them.

3. A series of common spaces in a variety of areas inside and outside hospital rooms should be created, and this should not hamper the privacy of personal space.

Future directions focusing on values of Asian people

Finally, it is a rule of thumb that when a certain personal space is provided to secure one’s territory and privacy, fruitful communication will occur more freely and naturally.

2.3 Behavioral Considerations of Bringing Personal Articles and Communications at Wards in Hospital
Recently in Japan, more hospitals are striving to shorten patients’ hospital stays and increase the patients’ quality of life at the same time by making further use of hospital functions and to reduce medical expenses. It is thought that one of the major factors that influences shortening
hospital days is the improvement recovery desire of a patient; this can be achieved by the standardization of nursing and providing good hospital facilities. However, the standardization of nursing and the enhancement of the hospital life have a number of contradictory factors.

Although recent hospitals are planned to provide rooms with more privacy, the multiple-bed room is mainly used in most present hospitals in Japan. It is hard to say if the above inconsistencies will be resolved in the near future. This study aims to obtain new knowledge about the hospital plans to meet such conflicting demands by examining the patient’s behavior of bringing personal items, their communication behaviors, and other activities in hospital wards. The survey focused primarily on patients staying in the four-bed rooms. Such shared rooms represent a prevalent type of wards within Japanese hospitals. The goal is to provide adequate recommendations to improve the quality of such spaces.
2.3.1 Survey findings

1. Bringing personal items.

In reference to the issue of bringing personal items to the hospital room, the results showed that the ratio of hobby items and ornaments for identity creation was few. This may be attributed to considerations of article sharing in the hospital.

2. Activities in Wards

The patients spend a lot of time on the bed because there is no place where they can stay. In that case, even the patient with comparatively high degree of freedom is spending time of leisure by the decubitus.

![Figure 2-17 Bringing Personal Articles](image-url)
3. Communications

In shared rooms, daily communication and mutual support between the patients may lead to providing a productive healing atmosphere and reducing the burden of nursing.

![Figure 2-18 Presence of Exchange and Mutual Aid Experience of Patient](image1)

![Figure 2-19 Ratio of Posture and Act](image2)

![Figure 2-20 Relation between Posture and Act](image3)
**Figure 2-23** Situation with Useful Mutual Aid

**Figure 2-24** Reason for Curtain Opening and Shutting of Patient

**Figure 2-25** Attitude to Mutual Aid
2.3.2 Conclusion
Sharing articles is thought to provide a chance for informal communications, yet considering ways to create more effective arrangements of common articles in a room is necessary. It is necessary to maintain the place of a moderate exchange with another patient or in the facility for patient’s whereabouts and active exchanges.

It is hope that the above may reveal appropriate reasons to substantiate changes in projects to meet new challenge of the needs, wants and expectations of residents, caregiver and care-provider in future endeavors and may also help to address the better understanding of emerging new generation of residential users of stay in hospital wards to home stay.

2.4 The Impact of Inpatients’ Belongings on their Behaviors in Multiple-Bed Room in Japanese Hospitals. A Study on Healing Environment for Early Patient Recovery.
Although not so extreme as in the U.S.A., modern medical facilities in Japan are under pressure to shorten the length of hospital stay. Therefore, while the introduction of clinical path aiming at standardization of medical and nursing procedures, the promotion of early rehabilitation, the cooperation with community medical and welfare facilities are attempted, the promotion of patients’ early recovery is also expected. While the substantial amenities in a ward, such as a day-space and a dining hall, are developed gradually, preparing environment for patient to promote early recovery is also in need.

2.4.1 Research Objectives and Methodology
The aim of this study is to find out the requirements for planning hospital ward environment by focusing on analysis of inpatients’ postures and behaviors according to attributes of patients. This paper intends to clarify the architectural planning features of multiple bed rooms and wards benefiting the early recovery.

In the latter part, the study focuses on partitioning furniture, especially desks that may have an effect on patients’ behaviors around bedside. And, it aims to find out the actual situation of patients’ belongings layout and the significance of desk usage.

The survey included visits to K and Y hospitals in Japan (Table 2-7). The observation was conducted for three hours every 15 minutes. Researchers recorded patient’s whereabouts,
postures, and behaviors. Attributes of patients were reproduced from medical records by nurses. Also, the physical features of the facilities and their architectural plans were analysed.

Hospital K wards were not provided with common spaces (Fig. 2-26, 2-27). On the other hand, in Hospital Y wards established in 2005, dining space and day-corner were provided. Also, all patients were given desks in addition to bedside tables (Fig. 2-28, 2-29, 2-30).

Also, the placements and various kinds of belongings of 46 inpatients’ bedside in multiple bed rooms were recorded by notes and photographs. The belongings in the closet were not surveyed considering patients’ privacy. The partitioning furniture in Hospital Y was a desk of 1,530 mm in width, 405 mm in depth and 722 mm in height placed next to a bed side table, which had clothes hanging function.

| Date          | Hospital K: January 12 and 14, 2010  
|               | Hospital Y: March 28 and 29, 2010   |
| Frequency     | Observation was carried out every 15-minute interval for six times in three shifts.  
|               | Shift 1: 10:00 – 11:30 am     
|               | Shift 2: 12:00 - 13:30 (lunch time)  
|               | Shift 3: 14:30 – 16:00 pm     |
| Content       | The whereabouts, postures and behaviors of patients, and their movements in ward area were recorded. |

**Table 2-7 Method**

<table>
<thead>
<tr>
<th>Name</th>
<th>Hospital K (K City, M Prefecture)</th>
<th>Hospital Y (A City, A Prefecture)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening Year and Number of Beds</td>
<td>1966, 234 beds</td>
<td>2005, 320 beds</td>
</tr>
<tr>
<td>Bed Room Composition</td>
<td>Single Rooms (14), 2-bed Rooms (42), 3-bed Rooms (4), 4-bed Rooms (25), Semi-Acute Rooms (6)</td>
<td>4-bed Rooms (63), Single Rooms (68)</td>
</tr>
</tbody>
</table>
| Floor Area of Bed Rooms   | Single and 2-bed Rooms: 12.4 m²,  
|                           | 4-bed Rooms and Semi-Acute Rooms: 23.5 m² | 4-bed Rooms: 36.53 m², Single Rooms: 18.62 m² |

**Table 2-8 Attributes of Surveyed Hospitals**
2.4.2 Results

2.4.2.1 Patients’ Attributes

Table 2-9 shows the attribute of the patient. The average age of patients and duration of hospital stay in both hospitals were about the same, however, the average level of capabilities of daily living activities among patients in Hospital Y was higher than that of Hospital K.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male: 27, Female: 35 (Total: 62)</td>
<td>Male: 24, Female: 22 (Total: 46)</td>
</tr>
<tr>
<td>Average Age</td>
<td>74 years old</td>
<td>72 years old</td>
</tr>
<tr>
<td>Average Duration of Stay</td>
<td>25 days</td>
<td>30 days</td>
</tr>
</tbody>
</table>

Patients’ capabilities of daily living activities in regards to movability:
I: bedfast, II: rising on bed, III: movable in bed room, IV: movable in ward area

Table 2-9 Patient Attributes
2.4.2.2 Patient’s Behaviors

a) Whereabouts

Analysis was conducted on the frequency of patients’ whereabouts using the number of times that a patient was observed as shown as Figure 2-31. “On a bed” refers to the state that a patient stays or sleeps on the bed. “Away from a bed” refers to a stay beside the bed or in the bed room. “Outside a room” refers to the state that a patient is in the ward or consultation room, but not in the bed room.

The ratio of “on the bed” was approximately 69% in the Hospital Y, but approximately 86% in the Hospital K. This is because the common use space including dining room and day-corner outside a bed room are provided in Hospital Y. Thus, the provision of such spaces affects the patients’ places to stay.

![Figure 2-26 Ratio of Whereabouts](image)

b) Postures

Figure 2-32 shows ratio of the patients’ postures in multiple bed rooms and Table 2-10 shows a classifications of their postures. In the Hospital K, "Lying on a bed" was approximately 70%, “Sitting on a bed” was 12%, "Sitting on a bed side" was 10%, "Sitting on a chair beside a bed" was 8%. On the other hand in the Hospital Y, "Lying on a bed" was 65%, "Sitting on a bed" was 17%, "Sitting on a bed side" was 7%, "Sitting on a chair beside a bed" 11%.

The ratio of “Lying on a bed” in the Hospital K was higher than that of Hospital Y, but the ratio of “Sitting on a chair beside a bed” was lower than that of Hospital Y. It is considered that difference between two hospitals related to floor area around a bed and layout of a chair. In addition, the ratio of "sitting on a bed" in Hospital Y was much higher because patients used reclining bed with a control of inclination degree. Thus, many patients could change inclination and spend time with more comfortable posture.
Table 2-10 Posture Classification

<table>
<thead>
<tr>
<th>Posture Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lying on a bed</td>
</tr>
<tr>
<td>Sitting on a bed (including using reclining function)</td>
</tr>
<tr>
<td>Sitting on a bed side (sitting on a bed side with one’s feet on floor)</td>
</tr>
<tr>
<td>Sitting on a chair beside a bed (sitting on a chair or wheelchair away from bed, including usage of portable toilet unit)</td>
</tr>
</tbody>
</table>

Table 2-11 Behavior Classification

<table>
<thead>
<tr>
<th>Medical Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>examination, treatment, medication, intravenous transfusion</td>
</tr>
<tr>
<td>Sleeping and Idling Activities</td>
</tr>
<tr>
<td>viewing window, viewing activities of others</td>
</tr>
<tr>
<td>Passive Activities</td>
</tr>
<tr>
<td>eating, body caring, moving, excretion</td>
</tr>
<tr>
<td>Leisure Activities</td>
</tr>
<tr>
<td>exercise, snacks, reading, writing, conversation</td>
</tr>
</tbody>
</table>

c) Relations between Postures and Behaviors

Table 2-11 shows the classifications of the behaviors and Figures 2-33, 2-34 show relations between postures and behaviors. A ratio of “Sleeping or idling” with lying on a bed in Hospital Y was higher than that of Hospital K. “Passive behaviors” such as looking outside during sitting on a bed was observed in the Hospital Y. Because a window area was large and a height of window sill was low, it is considered these are important factors to have a good view. “Sitting on a bed side” including the meal was carried out in a high ratio in Hospital Y. It is considered that using an over-bed table and a desk is one of the methods to get up. On the other hand, the rate of “Sitting on a chair beside a bed” was higher in the Hospital K. This is because there wasn’t a dining room to spend time outside the bedroom. Therefore, a patient who could walk by oneself also sat down on a wheelchair or a chair. The factor is that patients in Hospital Y could have meals both in a bedroom and a dining room.
2.4.3 Partitioning Furniture in Multiple Bed Rooms

In most of Japanese medical facilities, bedside tables have been used to store patients’ belongings and nursing materials. However, new functions such as desk space and clothes hanger space are planned because of the development of new territorialized type of 4-bed rooms, where patients are provide with better privacy, and the increase of bed room floor area per patient. The bedside tables of surveyed hospital had such a function. In this research, a bedside table including desk space and clothes hanger space is defined as partitioning furniture because they have the dimension of partitioning half-wall.

There are a number of features to design partitioning furniture. The first feature is related to usage such as the height and width of storage space and the shape of a storage door. The second feature is volume of storage space. The third is a function to control patients’ visual lines between beds as a half-wall. This study focuses on the first feature to analyse partitioning furniture especially focusing on the significance of desk space.
2.4.4 View on Materials in Medical and Welfare Facilities
The value of one’s belongings in the healing environment differs between medical and welfare facilities. The studies of welfare facilities shed light on the affirmative side of residents’ belongings evoking their activities. The hypothesis is that when a resident sees ones familiar belonging one tends to try to use it, as in a case where a female resident seeing a comb tries to comb her hair. This view allowed more amount of belongings and a need of more floor area, and supported the trend to change bed room environment from 4-bed room to a single room. However, as according to the study by Imai, the situation is different in the medical facilities where multiple bed rooms are mainly used for efficiency. The study refers to the occasional and orderly use of storage in the limited space. The former values the possession of variety of belongings and the latter requires to sort out one’s belongings in orderly placements.

2.4.5 Placements of Materials
The following show the 3 cases of placements and various kinds of materials especially focusing on the ratio of patients’ belongings and nursing materials.

**Case 1:** (Ms. CK) The materials on the desk and the over-bed table were patients’ belongings. The television set wasn’t used, but patients’ laptop PC was used. The patient used the desk, the over-bed table and the bedside table in different ways according to characteristics of materials and personal area.

![Figure 2-28 Materials on Desk 1](image)
### Table 2-12 Case 1

**Case 2:** (Ms. YS) All materials were for nursing and there were no materials on the over-bed table. From the point of patient attributes, the family visit was not frequent and their support was only at the time of need, moderate dementia symptoms were apparent and high level of nursing was needed. Therefore, it was considered that the patient had no control of desks and nurses used them to put nursing materials in case their frequent visits.

<table>
<thead>
<tr>
<th>Clinical Discipline</th>
<th>Medical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Female</td>
</tr>
<tr>
<td>Age</td>
<td>86 years old</td>
</tr>
<tr>
<td>Duration of Stay</td>
<td>143 days</td>
</tr>
<tr>
<td>Level of Nursing Needs</td>
<td>High</td>
</tr>
<tr>
<td>Level of Dementia</td>
<td>Moderate symptoms</td>
</tr>
<tr>
<td>Capabilities of Daily Living Activities</td>
<td>II (assistance is required)</td>
</tr>
<tr>
<td>Family Support</td>
<td>At the time of necessity</td>
</tr>
<tr>
<td>State of daily living</td>
<td>Spend lunchtime at a staff station every day</td>
</tr>
</tbody>
</table>

**Figure 2-29 Materials on Desk 2**
Case 3: (Mr. MK) Nursing materials and patients’ belongings were intermingled on the desk. The desk was kept in order, but the magazines and trash were put on the corner of over-bed table.

![Figure 2-30 Materials on Desk 3](image)

<table>
<thead>
<tr>
<th>Clinical Discipline</th>
<th>Medical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male</td>
</tr>
<tr>
<td>Age</td>
<td>66 years old</td>
</tr>
<tr>
<td>Duration of Stay</td>
<td>14 days</td>
</tr>
<tr>
<td>Level of Nursing Needs</td>
<td>Low</td>
</tr>
<tr>
<td>Level of Dementia</td>
<td>None</td>
</tr>
<tr>
<td>Capabilities of Daily Living Activities</td>
<td>IV (assistance is not required)</td>
</tr>
<tr>
<td>State of Daily Living</td>
<td>Often goes to the dining hall to talk and watch TV</td>
</tr>
</tbody>
</table>

Table 2-14 Case 3

2.4.6. Conclusion

This study aimed to find out the requirements for early recovery through the observation of patients. A ward should be provided with commonly used facilities, dining hall or day-space, so that patients can spend time in addition to the bed rooms.

Moreover, even if patients can't be away from beds, giving an opportunity to get up instead of lying on the bed is important. Therefore, it's efficient to use a reclining bed where one can change the posture and to ensure the view from the bed room.

For three case studies, three features were considered about the placement of materials on the desk. First, it is estimated that patients’ attribute such as level of dementia and capabilities of daily living activities have a large effect. Second, the use of the desk and the over-bed table depends on patients’ individual intention. Third, the desk is used as space to put nursing materials.
A desk was not used for meals and writing. An over-bed table was used for meals in multiple bed rooms. It is considered that an over-bed table is useful for patients to adjust directions when they see outside of windows or talk with visitors. From the height feature, a desk and an over-bed table are the same, and patients are able to put materials on desks even if they are lying on the bed. Also, many materials for daily use are appeared on the desk comparing to using only the bedside table. A desk could be valued in these points. If it is true that a variety of belongings are effective to evoke patients’ activities on their initiative, the extensive presence of their belongings on desks are effective to realize opportunities to help to the early recovery.

2.5 Planning and Design Issues of Single Bed Room Inpatient Quarters in a Cross-Cultural and Multi-Disciplinary Exchange Context

As a break-through from the dichotomy between single bed rooms and multiple bed rooms, privacy oriented multiple bed room, where each patient will be provided with his/her private corner, have been designed in new hospitals in Japan in response to call for the privacy provision of inpatients. While single rooms with multiple bed room like arrangement, or Pod Ward Plan, are planned for better nursing supervision by shortening the walking distance of nurses. However, the privacy provision following the Euro-American value of life may lead to segregation of inpatients resulting in a lack of communication and jeopardizing the virtue of mutual aid among patients, a tradition of Japan and Asia.

This study focuses firstly on the traditional ward planning of Nightingale Ward and its implication in some newly built hospital inpatient quarters. Then, a suitable balance between privacy and communication of inpatients to offer appropriate choices for every inpatient will be discussed. Finally, the survey results are shown to clarify the belongings and behavior of inpatients to reveal the privacy requirements and on the patterns of communication requirements among inpatients. Consequently, suggestions are made to better resolve the controversial issue of privacy versus nursing supervision and/or communication among patients, their families and nurses in the inpatient bed rooms.

2.5.1 Rediscovery of Nightingale Ward

Nightingale Ward is a typical ward building which is designed and built following a common design concept for healthcare facility advocated by Florence Nightingale in 19th century, and
they are found in various countries around the world. On entering the 21\textsuperscript{st} century unique hospital architecture were designed and built in Japan and UK in 2000's.

### 2.5.2 Katta Public General Hospital

Katta Public General Hospital was introduced in June 2002 issue of Shin Kenchiku magazine. 308 bedded hospital was rebuilt at a new site to acquire floor area of 26,164 square meters, which is 85 m\textsuperscript{2} per bed, and was designed by a collaboration of three architects who are Taro Ashiwara, Ko Kitayama, and Hideto Horiike. Although many specialists for medical services and healthcare architecture were involved in the design process, three architects stayed aloof from a tower on muffin type of building where a high-rise inpatient quarters tower sits on services block footage. The building type is often used in hospital buildings in urban settings. They instead sought for low-rise three story building with inpatient wards on the third floor. Ashiwara mentioned about a modern interpretation of 19th century Nightingale Ward in the magazine interview. It was assumed assume that there might have been an advice from Professor Kazumasa Otaki of Yokohama National University at that time. It is quite interesting that the full Japanese translation of Florence Nightingale's 1860 classic "Notes on Nursing" was revised in 2000. The first translation may be in 1974 as Nightingale Writing Series including "Notes on Hospitals". In the floor plan of Katta Hospital ward block a combination of 4 bed rooms and single rooms are used. Thus, the 30 bed ward in original Nightingale Ward is no longer of use. However, because the ward wings are all on the third floor they are placed a parallel rows facing 9.3 meters wide courtyards. This arrangement of ward wings follows the design principle of pavilion arrangement used in Nightingale Hospitals. The interview, also refers to the features of Nightingale Wards in relations to the air borne cross infections, which was one of results of 19th century rational thinking. The Hospital received a monthly critique to have realized a cozy environment by two critiques as introduced in the following month issue of the magazine.

### 2.5.3 Evelina Children's Hospital

Evelina Children's Hospital was introduced in May 2005 issue of the Architectural Review magazine. On the formation of the National Health Service, the institution was incorporated within the trust responsible for St. Thomas's and Guy's Hospital, and relocated to the new site next to 1871 Nightingale Ward complex. The new building housing 140 beds with floor area of 16,500 m\textsuperscript{2} or 118 m\textsuperscript{2} per bed, was designed by Hopkins Architects. The architects claim in their home page that it was their first healthcare project, where ideas pioneered in workplace
design have been applied. They claim that like offices, hospitals demand efficient and flexible layouts, with casual social interaction spaces. Following an introductory article on evidence-based design by Professor Roger Ulrich, which showed that certain environments would help patients recover more quickly, using fewer drug treatments, Paul Finch, Architectural Review article writer, acknowledges the design of Children's Hospital as a hospital that doesn't feel like a hospital reflecting high aspirations both for an architectural "wow" factor, and for evidently high level of construction quality. The ward plan consists of six- and four-bed bays and single rooms. The paired bays are covered by one nursing station and the use of counter segregation to a snaking corridor results in an open environment of a traditional Nightingale Ward.

2.5.4 Privacy vs. Supervision
A comprehensive introduction of Nightingale Ward is provided by Thompson and Gordin (1975). In the publication a transition in American Hospitals from the use of multi-bed room to that of single-bed room is described in detail referring to various building examples, research papers in US and UK, and surveys carried out in Yale University Hospital. The American preference for privacy is signified by the chapter title in the book, "A Loud, Loud Noisee about Privacy: A Review of Contemporary American Literature on the Hospital Room."

Most recently, Padbury (2013) introduces all single room NICU built at the Women and Infants Hospital of Rhode Island. The underlining concept is that the physical environment can have profound effects on the recovery of the tiniest infants who are otherwise exposed for weeks to invariant lighting, sleep deprivation, and auditory disruption in an open multi-bed room. Thus, the design of the new unit is critical to the effective delivery of developmentally appropriate family-sensitive care.

2.5.5 Merits and Demerits of Single Bed Room and Multiple Bed Room
When merits of single bed rooms are compared with those of multiple bed rooms, the former provides more privacy, while the latter realizes easier observation efficiency in Nursing. (Refer Figure 2-10)

A variety of recent ward room design in Japan proposes privacy oriented multiple bed rooms. In the example at M Hospital, a small window is placed for each bed to provide for better view and air flow. It can be said that the plan secures more privacy with a limited floor area. However, the corridor space inside the bed room is found inadequate and the space between beds is of minimum size. (Refer Figure 2-12)
In a newly proposed Pod Ward Plan, single rooms are arranged like a multiple bed room. Examples are found at G hospital under construction and at T Nursing Home. At G Hospital a common space in the center of pod plan provides for recording work in nursing and communications among patients. While as in T Nursing Home, the floor area for central common space is realized with larger area in welfare housing facilities for the elderly. (Refer Figure 2-13)

Above two planning and design approach may result in a better balance between the two issues of privacy vs. supervision. (Refer Figure 2-11)

An ideal healing environment may provide for a suitable balance between contradictory privacy and communications, and secures adequate choice for all patients. (Refer Figure 2-13)

2.5.6 Survey and Results

Our recent survey included visits to two hospitals in Japan. K Hospital was opened in 1966 and the total number of beds is 234 beds. And, Y Hospital was opened in 2005 with 320 beds. The observation was conducted for three hours every 15 minutes. Researchers recorded patient's whereabouts, postures, and behaviors. Attributes of patients were reproduced from medical records by nurses. Also, the physical features of the facilities and their architectural plans were analyzed.

In Y Hospital wards, dining space and day corner were provided. Also, all patients were given desks in addition to bedside tables. Also, the placements and various kinds of belongings of 46 inpatients' bedside in multiple bed rooms were recorded by notes and photographs. The belongings in the closet were not surveyed considering patients' privacy. The partitioning furniture in Y Hospital was a desk of 1,530 mm in width, 405 mm in depth and 722 mm in height placed next to a bed side table, which had clothes hanging function. (Figures 2-26 to 2-30)

2.5.7 Patient's Behaviors

a) Whereabouts

Analysis was conducted on the frequency of patients' whereabouts using the number of times that a patient was observed as shown as Figure 2-31. "On a bed" refers to the state that a patient stays or sleeps on the bed. "Away from a bed" refers to a stay beside the bed or in the bed room.
"Outside a room" refers to the state that a patient is in the ward or consultation room, but not in the bed room.

The ratio of "on the bed" was approximately 69% in the Y Hospital, but approximately 86% in K Hospital. This is because the common use space including dining room and day-corner outside a bed room are provided in Y Hospital. Thus, the provision of such spaces affects the patients' places to stay. (Figure (2-31)

b) Postures

Figure 2-32 shows ratio of the patients' postures in multiple bed rooms and Table 2-10 shows a classifications of their postures. In K Hospital, "Lying on a bed" was approximately 70%, "Sitting on a bed" was 12%, "Sitting on a bed side" was 10%, "Sitting on a chair beside a bed" was 8%. On the other hand in Y Hospital, "Lying on a bed" was 65%, "Sitting on a bed" was 17%, "Sitting on a bed side" was 7%, "Sitting on a chair beside a bed" 11%.

The ratio of "Lying on a bed" in K Hospital was higher than that of Y Hospital, but the ratio of "Sitting on a chair beside a bed" was lower than that of Y Hospital. It is considered that difference between two hospitals related to floor area around a bed and layout of a chair. In addition, the ratio of "sitting on a bed" in Y Hospital was much higher because patients used reclining bed with a control of inclination degree. Thus, many patients could change inclination and spend time with more comfortable posture.

c) Relations between Postures and Behaviors

Table 2-11 shows the classifications of the behaviors and Figures 2-33, 2-34 show relations between postures and behaviors. A ratio of" Sleeping or idling" with lying on a bed in Y Hospital was higher than that of K Hospital. "Passive behaviors" such as looking outside during sitting on a bed was observed in Y Hospital. Because a window area was large and a height of window sill was low, it is considered these are important factors to have a good view. "Sitting on a bed side" including the meal was carried out in a high ratio in Y Hospital. It is considered that using an over-bed table and a desk is one of the methods to get up. On the other hand, the rate of "Sitting on a chair beside a bed" was higher in K Hospital, This is because there wasn't a dining room to spend time outside the bedroom. Therefore, a patient who could walk by oneself also sat down on a wheelchair or a chair. The factor is that patients in Y Hospital could have meals both in a bedroom and a dining room.
2.5.8 Partitioning Furniture in Multiple Bed Rooms

In most of Japanese medical facilities, bedside tables have been used to store patients' belongings and nursing materials. However, new functions such as desk space and clothes hanger space are planned because of the development of new territorialized type of 4-bed rooms, where patients are provide with better privacy, and the increase of bed room floor area per patient. The bedside tables of surveyed hospital had such a function. In this research, a bedside table including desk space and clothes hanger space is defined as partitioning furniture because they have the dimension of partitioning half-wall.

There are a number of features to design partitioning furniture. The first feature is related to usage such as the height and width of storage space and the shape of a storage door. The second feature is volume of storage space. The third is a function to control patients' visual lines between beds as a half-wall. This study focuses on the first feature to analyse partitioning furniture especially focusing on the significance of desk space.

2.5.9 View on Materials in Medical and Welfare Facilities

The value of one's belongings in the healing environment differs between medical and welfare facilities. The studies of welfare facilities shed light on the affirmative side of residents' belongings evoking their activities. The hypothesis is that when a resident sees ones familiar belonging one tends to try to use it, as in a case where a female resident seeing a comb tries to comb her hair. This view allowed more amount of belongings and a need of more floor area, and supported the trend to change bed room environment from 4-bed room to a single room. However, as according to the study by Ima, the situation is different in the medical facilities where multiple bed rooms are mainly used for efficiency. The study refers to the occasional and orderly use of storage in the limited space. The former values the possession of variety of belongings and the latter requires to sort out one's belongings in orderly placements.

In the Survey most patients tended to lie down on their beds. However, various living activities were carried out in that position. A physical environment design to afford for various patient positions is required to provide for communications and to enhance quicker recovery. Some patients place their beds closer for easier communication. A system should be made to freely place patient beds. (Figure (2-17)
2.5.10 Conclusion
The following suggestions are made to better resolve the controversial issue of privacy versus communication:

1) The management system and environmental design should be realized to support the free and natural occurrence of communication among inpatients and their families.
2) It is important to furnish and implement the adjustments of interpersonal relationships among inpatients and also to reduce unnecessary strict rules among them.
3) A series of common spaces in a variety of areas inside and outside hospital rooms should be created, and this should not hamper the privacy of personal space.

Future directions focusing on values of Asian people

Finally, it is a rule of thumb that when a certain personal space is provided to secure one's territory and privacy, fruitful communication will occur more freely and naturally.

2.6 Highlights on Lessons Learnt
From the research on the key aspects of Japan's nursing homes, the study concludes that the followings have impacts on the immediate planning, design and management of Singapore nursing homes and its facilities:

a) The better understanding on the use of single rooms in Japanese contemporary unit care facilities and of multi-bed rooms and single rooms in Japanese hospitals and the reason of larger numbers in Singapore nursing home lead to the acceptance of the design proposal of 6-bedded bay.

b) CL's position where the residents mainly spent time together and the private room has a relationship with the area of common space and lounge space. It confirms the appropriate decision taken on the inclusion of a common space for each of the 6 bedded ward

c) When residents need to pass through other CL in order to reach their own unit, this plan's quality as a home-like environment needs to be questioned. When the main corridor is made perpendicular to 6-bedded wards resolves this issue.

d) A series of common spaces in a variety of areas inside and outside hospital rooms should be created, and this should not hamper the privacy of personal space.
e) The ramp is a common space and to be used as a safe ‘nocturnal walk-about’ space and exercise area for residents.

f) When a certain personal space is provided to secure one’s territory and privacy, fruitful communication will occur more freely and naturally.

g) Sharing articles is thought to provide a chance for informal communications, yet considering ways to create more effective arrangements of common articles in a room is necessary. It is necessary to maintain the place of a moderate exchange with another patient or in the facility for patient’s whereabouts and active exchanges.

Other findings as listed below can have important impact in improvement and changes to the existing built environment and on constructive re-use of the development

h) In UTNH it is assumed that the facilities create the staff’s working shift not in a single unit but in two or more units. It can be said that there is a very close relation between space composition and staffing method.

i) When the staffing method was assumed following the condition of national standard and/or good faith effort regulation, it turned out that in order to allocate two staff persons in the daytime in the unit to enable effective individual care, the facility needed to allocate larger numbers of staff than that of the national standard or to configure staffing among two or more units rather than a single unit.

j) The facility is responsible for the care method or service provision method. Therefore, an architect and manager need to cooperate to develop a plan;

Last but not least, the following are useful parameters and guidelines for the planning, design and management of healthcare built environment:

k) The realization of an individual care is attained only after the adoption of holistic planning.

l) This report on the Japanese experience should serve other Asian nations expecting faster aging of their population and other nations with similar demographic or care tendencies.

m) The management system and environmental design should be realized to support the free and natural occurrence of communication among inpatients.

n) It is important to furnish and implement the adjustments of interpersonal relationship among inpatients and also to reduce unnecessary heavy rules among them.
The purpose of the research on Japanese’s examples is part of the efforts to benchmark on the key aspects and to examine the close and impacting relationships of Nurse, Nursing and Public Nursing Home with Doctors, Medicine and Management of Cost. Also to adopt, to put in place and/or to avoid issues and aspects that may have presently or in near future significant impact on Singapore’s planning, design and management of nursing homes. Many of these issues are apparent in the existing built environment of nursing homes in Singapore, as shown in the survey of the existing homes in Singapore in Chapter 3.
References


Thompson J. D., Gordin G. (1975). The Hospital; A Social and Architectural History, Yale University Press
CHAPTER 3
EXISTING PUBLIC NURSING HOMES IN SINGAPORE

3.1 Public Nursing homes in Singapore

3.1.1 Context, Time and Circumstances
The essential ‘Holy Trinity’ in Singapore’s Public Healthcare ‘Hardware’ facilities can normally be accepted to be Nurse, Nursing and Public Nursing Home. They have close and impacting relationships in the Healthcare System together with the ‘Software’ essentials of Doctors, Medicine and Management of Cost.

Pattarin Kusolpalin’s ‘Angel in White’ chronicled the history of nursing from 1819 until Independence. It is an important historical narration of the role each played. There has been substantial progress since 1820s’. At that time, some “nurses” were actually chained convicts. Nowadays, there are more than 37,000 nurses and midwives. Singapore celebrates Nurses’ Day on 1 August each year to mark the beginnings of Nursing in the General Hospital at Sepoy Lines in 1885.

The Review Article ‘Changing Landscape of Nursing Home in Singapore: ‘Challenges in the 21st Century’ (by Gabriel HZ Wong, Philip LK Yap, and Weng Sun Pang) explained the history of the changing landscape of nursing homes in Singapore since its Independence in 1965. The evolving government policies, the on-going challenges and trade-offs of nursing home regulations, and the development of the healthcare facilities provide rich information to understand its humble beginning.

Today’s nursing homes can trace their origins back to 1930’s, when Community based charitable organizations, like Little Sisters of the Poor who founded St Theresa’s Home in 1935, were the first to provide sheltered accommodations. They catered for homeless and destitute elderly immigrants. Following WWII and the Japanese Occupation, social welfare program began to cater for the numbers of displaced population. The Nursing Homes and Maternity Homes Registration Ordinance, passed by the City Council and Rural Board in 1959, was an attempt to regulate these homes, alluding to the need to increase accountability and to incentivize good care.
The public debate and awareness for nursing homes gradually languished. Unfortunately, the Government had underestimated and neglected to recognize the seriousness of an ageing population, inflicted by declining birth rates and increased life expectancy, which had contributed to hospital overcrowding threatening a “bed crisis”. Moreover, it was imposing an increasing load on the contracting supply of caregivers.

The Government took concerted effort to re-examine policy towards public nursing homes and encouraged the growth of them. It released 17 tender sites for private companies to set up nursing homes and increased grants and subsidies for voluntary welfare organizations (VWOs) to construct and maintain nursing homes. In the 1990’s, the subsidies were up to 90% of capital costs for construction and 50% of operating costs. At the same period, the Government attempted to introduce audits in order to improve medical care. Nursing home operators, sensing their established modes of operation were at threat, opposed these plans. As a result, the plans were abandoned.

The necessity as well as the difficulties in monitoring and regulating nursing homes were made apparent in the Nightingale Nursing Home incident in 2011, which made headlines after a man secretly filmed his 77-year-old mother being slapped and thrown onto a bed at home, showcasing the lack of quality care at some homes.

To compound matters, the construction of the public nursing home at Bishan Street 13, stirred nationwide conversations in 2012. Residents in the vicinity petitioned the government to have it situated elsewhere. They claimed the decreased ventilation would raise utility charges to have their homes acoustically treated and air-conditioned to prevent elderly “groaning” into their homes. The Bishan nursing home is an example of NIMBY (Not-In-My-Back-Yard) syndrome, where residents oppose to a new development, like public nursing homes, near their estates.

Even though public nursing homes can be considered a public good, the lack of societal support and acceptance for public nursing homes undermines the wider eldercare initiatives. This is amplified by the insufficiency of regulation, which also increases the risks of moral hazards and poor quality care. Efficient regulation can deter errant behavior; ensure quality care; improving societal support the same time.

The government’s effort to regulate nursing homes to resolve problems have faced several issues some arising from new initiatives while some are recurring problems. Principally they center on how to balance the risks of under-regulation and over-regulation. Many subscribed
to the belief that “promotion of filial piety values” could be a “solution” to an ageing population, believing that it may reduce the risks of an increasing reliance on public nursing homes and in the process strengthened traditional values of filial piety. Notwithstanding, some believe that an increase in number of public nursing homes may potentially encourage children to abrogate this responsibility. Nevertheless, they are needed for the chronically or terminally ill as most families often lack the resources and expertise to care for them. Further encouragements have been made for homes to “expand their services” to offer day care and rehabilitation services to the wider elderly community.

Other considerations by the government include the privatization of the public nursing home industry. This naturally raises other implications such as the tenuous balancing act between voluntary and commercial operators, with 4,979 patients in the former, and 3,039 in the latter.

Other idea seeks to create homely and communal residence for residents - an emphasis on quality of life beyond safety and risk management - homes to be more aesthetically appealing and with more recreational spaces for residents. Such care is expected to improve resident welfare by according them with more dignity, agency and respect, and merge the medical and social facets of long-term care. It would also allow nursing homes to evolve beyond its current custodial roles, towards more holistic and person centered care.

3.1.2 Classification of Different Types of Nursing Homes in Singapore.

One of the many strengths of Singapore’s multi-racial, multi-cultural and multi-religious society is each provides for its own cohort while in tandem it supports the others. Beyond the selection of choice of residency, there are both public and privately organized homes that support the different age-group’s needs, wants and expectations.

In 1982, Committee on the Problems of the Aged was formed to study the problems that would be faced by society and the aged themselves due to the ageing population. In 1984, the committee presented its report, in which homes for the elderly were classified into 2 broad categories according to their jurisdiction:

a) **Homes for the destitute elderly**, under the responsibility of the then Ministry of Community Youth and Sports (MCYS)

b) **Homes for the sickly elderly**, managed by voluntary welfare organizations. Both private and public organizations would also be overseen and assisted by Ministry of Health (MOH) to ensure they were “adequately and efficiently managed”.

---

Mie University, Graduate School of Engineering

三重大学，大学院工学研究科
The Homes for the Aged Act was passed in 1989. It governs nursing homes and grants power to the Director to issue, transfer or to terminate their licenses. The Director can also order the nursing homes to provide relevant information, facing fine of $2000 in case of refusal.

Specialized care such as dementia created the need to have staff skilled to manage dementia and homes specializing in dementia care to care for those with higher needs such as difficult to manage behavior. It also created the issue of providing specialized dementia homes versus up-skilling all nursing homes to care for residents with dementia.

In 1990’s, the government categorized the elderly patients into 4 classes. They were based on time-motion studies of the resources needed to perform care procedures. The functional status and care needs of patients under the four nursing care "Category" are shown in Table 3-1 below:

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>FUNCTIONAL STATUS/CARE NEEDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category I</td>
<td>Physically and mentally independent, may or may not use walking aids, do not need or need only minimal assistance in activities of daily living (ADL)¹</td>
</tr>
<tr>
<td>(least dependent)</td>
<td></td>
</tr>
<tr>
<td>Category II</td>
<td>Semi-ambulant and/or mildly senile, requires some physical assistance and supervision in ADL</td>
</tr>
<tr>
<td>Category III</td>
<td>Wheel-chair bound and/or suffering from dementia, need help in ADL and supervision most of the time.</td>
</tr>
<tr>
<td>Category IV</td>
<td>Bedridden and require total assistance and supervision for every aspect of ADL.</td>
</tr>
<tr>
<td>(most dependent)</td>
<td></td>
</tr>
</tbody>
</table>

Table 3-1 Functional Status and Care Needs of Patients under Different Nursing Care

Nursing homes were encouraged to take on elders with higher medical needs and increased dependency (Category III and IV), as government gave substantial financial and subsidy incentives, and in the process introduced medical facet to nursing.

In line with that, the Woodlands Home for the Aged² was demolished. 3 new homes were constructed in its place: Christalite Methodist Home for the Aged, Bukit Batok Home for the Aged and Jamiiyah Home for the Aged - under the purview of MCYS. These new homes had upgraded amenities and improved care capabilities with communal areas for socialization, gathering points for volunteers and social program for residents.

These Homes for the destitute elderly heralded a paradigm shift in long-term care for the elderly. This shift was towards a more holistic and well-rounded living environment. The community

---

¹ Examples of activities of daily living that a patient may require assistance while in a Nursing Home include mobility, feeding, toileting, etc.
² Woodlands Home for the Aged was the first government-directed nursing home’s initiative to be converted from a disused school. Conditions of these early homes were spartan. They were built dormitory-style and only had toilets at the end of each block.
supported with sponsorship of red packets for residents, while doctors volunteered their time at the facilities.

3.2 Survey on Existing Nursing Homes

Singapore is a highly populated city and an aging society. An effective planning, design and management of welfare facilities and support services are both necessary and essential in Singapore. In 1990’s, there were 3 existing psychiatric homes which were operating at full capacity. The Singapore government foresaw an aging population and prepared for a long-term residential psychiatric care to meet the growth. Hence, a national program for subsidized nursing home facilities for stabilized psychiatric patients was introduced to meet the demand. The 300-Bedded Psychiatric Nursing Home at Buangkok Medical Park (Chapter 4) was one of the five nursing homes set up under this program.

The Architect and all the other consultants were obliged to participate in a series of case studies carried out on 9 privately operated nursing homes. The objectives of the case studies was to understand the relation of the operational aspect and the space layout of these nursing homes. From these understanding, a workshop would be conducted to further evaluate the findings to enhance the design brief of the project. The study also aimed to clarify the current state of the welfare residence facilities in Singapore and to envision the Facility Management in Singapore for the future. The overall goals of the study were:

- To learn the positive points to adapt in planning a nursing home.
- To learn the pitfalls to avoid in planning a nursing home.
- To understand the Homes’ management planning of day Center, Staff Quarters, Kitchen and Laundry (e.g. outsource or provided in Homes.)
- To view the best attributes of the Built – Environment to meet the 5 senses.

The report on this study and Post Occupancy Evaluation (POE) on this issue provide beneficial feedbacks from behavioral issues that can help in developing effective and meaningful built environment of welfare facilities in Singapore. The study enabled understanding the common features of facilities composition and room layouts of selected facilities in Singapore.

One of the key factors of study was the impact of high-rise built environment on psychiatric residents. High-rise built environment has both direct and indirect negative impacts on human well-being and the quality of life as defined by World Health Organization (1997). These
impacts of high-rise buildings depend on creative design elements, the number and level of floors, the quality of its built environment and structural issues. Those living on higher floors may suffer from mental anguish due to their concern of vertical transportation to lower floors. Less able persons may experience unpleasant phobia within the confines of elevator and may also exhibit restlessness while walking on stairs. These are some of the key reasons why high-rise built environment is linked to psychological distress.

Study by Cooper on issues related the living in high-rise (Cooper, 2009) established the need of quality of the fabric of the built environment. It affects visual and tactile senses and sense of safety. It also pointed out that layout and way-finding impact sense of safety and contentedness and does indeed confirmed the usefulness and need to investigate beyond one’s domain. Fortuitously, the following main issues were identified that relate to our sensory stimulation: that is, what we see, smell, touch, taste and hear. Also noise and light are significant intervening variables. Further access to nature and the ‘natural’ are significant contributors to individual mental capital and wellbeing. Thus designers, developers and those who manage and maintain them, should refer to the evidence available and use it to design and manage the environment better.

Provision and creative enhancement of common spaces for social interaction from small group spaces to larger and more spaces will reduce the sense associated with perceived control and increase the sense of comfort. Also performance and discharge of daily activities and duties on the creative enhancement provided are appreciated and accepted by patients and caregivers respectively. Furthermore, design of high-rise built environment with higher quality finishes and other architectural features has the potential to increase the perception of usefulness. Pleasant and unpleasant effect on moods and emotions are the two other dimensions that significantly impact patients living in high-rise built environment. Good quality built environment has been accepted to reduce psychological distress, contributing to the well-being of the residents, especially when living in high-rise buildings.

3.2.1 Research Method

Surveys were conducted at 9 selected Nursing Homes. The facilities were selected for study/visit as they specifically differ in terms of jurisdiction, classification and type of residents. The homes were classified into 4 subcategories according to the type of the provided service. Therefore, the facilities were divided into the frames of the system: nursing home, psychiatric
existing public nursing homes in Singapore. Table 3-2 shows the outline of Nursing Homes in Singapore, according to these frames at the time of the study (2010).

### Table 3-2 Outline of Nursing Homes in Singapore

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Classification</th>
<th>Outline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Health</td>
<td>Nursing Home (N)</td>
<td>VWO management: 29 Homes and Private management: 32 Homes</td>
</tr>
<tr>
<td></td>
<td>Psychiatric Nursing Home (P)</td>
<td>3 facilities with 1 proposal under implementation.</td>
</tr>
<tr>
<td>Ministry of Community Development, Youth &amp; Sports</td>
<td>Welfare Home (W)</td>
<td>Nursing and to return to society. 10 facilities.</td>
</tr>
<tr>
<td></td>
<td>Residential Home (R)</td>
<td>Congenital mentally disabled person. - 6 facilities for Adults</td>
</tr>
</tbody>
</table>

**Note:** Nursing Homes provide long-term skilled nursing care for older persons. These older persons do not have families or caregivers to look after them at home, or the caregiver is unable to provide the level of nursing care required. Some nursing homes provide care for persons with special needs like dementia and persons with stabilised psychiatric conditions.

Psychiatric nursing homes take care of patients with psychiatric conditions, who will get therapy and activities that develop their social skills and physical health. They also provide temporary accommodation for patients recovering from mental illness, and programmes to help them return home.

Welfare Homes are responsible under the Destitute Persons Act for the care, reception and rehabilitation of destitute persons. The homes are run by VWOs serving as managing agents for the Ministry.

Residential Home provide long-term housing and care for adults with disabilities who are neglected or whose caregivers are not capable of caring for them. They are physically disabled but do not require heavy nursing care.

Source: Ministry of Health/ Ministry of Community Development, Youth & Sports

The surveys included visit to the facilities from August 23rd through September 1st 2010. Several interviews were also conducted with staff and managers of the facilities, following standardized questionnaires. The research studied the composition of the selected facilities, their general conditions and the prominent architectural features. The study of common space focused on some specific design elements such as ramps, dining areas and healing gardens. As a result, the features for architectural plans of facilities have been clarified accordingly to types of facilities tendency. The 9 selected Nursing Homes are:
The guide ‘A Guidebook on Nursing Homes issued in 2002, a standard reference source and guide to organizations involved in the setting up and management of nursing homes, was used as a guideline for the survey check-list. It covers matters concerning tenant’s room and living space includes guidelines such as:

- 6 m² per a bed are secured
- The bed, the pillow, and the locker chair of each tenant are prepared
- Day room for each unit of 60 m² is provided
- The staff dormitory is included in facilities
- Facility that has 200 beds is preferable

Lists of furniture and equipment, and organization’s mission, philosophy and objectives, are also given.

<table>
<thead>
<tr>
<th>Code</th>
<th>Name of Facilities</th>
<th>Establ.</th>
<th>No of beds</th>
<th>No. of Storeys</th>
<th>No. of Staff</th>
<th>Tenants’ Category</th>
<th>Tenants’ mix</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>Lions Home</td>
<td>2003</td>
<td>200</td>
<td>6</td>
<td>25 for 43</td>
<td>Cat 1, 2 &amp; 3</td>
<td>Elderly, dementia</td>
</tr>
<tr>
<td>N2</td>
<td>Apex Harmony Lodge</td>
<td>1999</td>
<td>210</td>
<td>3</td>
<td>70</td>
<td>Cat 1 &amp; 2</td>
<td>Elderly, dementia</td>
</tr>
<tr>
<td>N3</td>
<td>Peace Haven Nursing Home</td>
<td>2000</td>
<td>401</td>
<td>4</td>
<td>200</td>
<td>Cat 3 &amp; 4</td>
<td>Elderly, dementia, psychiatric 5%</td>
</tr>
<tr>
<td>P1</td>
<td>Hougang Care Centre</td>
<td>2006</td>
<td>176</td>
<td>5</td>
<td>46</td>
<td>Cat 1, 2, 3 &amp; 4</td>
<td>Psychiatric (dementia), Average age 69 years</td>
</tr>
<tr>
<td>P2</td>
<td>Sun Love Homes</td>
<td>2005</td>
<td>208</td>
<td>7</td>
<td>75</td>
<td>-</td>
<td>Psychiatric 90%, Dementia 10%</td>
</tr>
<tr>
<td>W1</td>
<td>Simei Care Centre</td>
<td>2002</td>
<td>150</td>
<td>9</td>
<td>40</td>
<td>Cat 1</td>
<td>Mix of young adults</td>
</tr>
<tr>
<td>W2</td>
<td>Pelangi Village (Tembusu Home)</td>
<td>2002</td>
<td>203</td>
<td>7</td>
<td>50</td>
<td>Cat 1 &amp; 2</td>
<td>Psychiatric average age above 50, Only women.</td>
</tr>
<tr>
<td>R1</td>
<td>Econ Nursing Home</td>
<td>2001</td>
<td>159</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>Elderly, dementia</td>
</tr>
<tr>
<td>R2</td>
<td>Tai Pei Social Centre</td>
<td>1998</td>
<td>132</td>
<td>4</td>
<td>40</td>
<td>Cat 1 &amp; 2</td>
<td>Intellectual disability Average age 44 years old.</td>
</tr>
</tbody>
</table>

Table 3-3 Outline of Studied 9 Facilities

Figure 3-1 Typical Floor Plans of Selected 9 Facilities

The guide ‘A Guidebook on Nursing Homes issued in 2002, a standard reference source and guide to organizations involved in the setting up and management of nursing homes, was used as a guideline for the survey check-list. It covers matters concerning tenant’s room and living space includes guidelines such as:

- 6 m² per a bed are secured
- The bed, the pillow, and the locker chair of each tenant are prepared
- Day room for each unit of 60 m² is provided
- The staff dormitory is included in facilities
- Facility that has 200 beds is preferable

Lists of furniture and equipment, and organization’s mission, philosophy and objectives, are also given.
3.2.2 Facilities composition

1. **Unit composition.** There are units with the dining room, the day space, and the nurse station (NS) in N1, N2, N3, and living of the tenants is carried out in the unit. Therefore, the architectural plan and the nursing practice contradict each other for the dementia unit similar in NH. Moreover, there are no units in W1, W2, R1, and R2 of WH and RH. The reason for this is that the purpose for accommodating the poor is stronger than the purpose for care. The scales of the all units are comparatively large; 48 beds in P1 and about 30 beds in other facilities.

2. **Common activity facilities.** Facilities with dining hall, also used as multi-purpose hall (MPH), are W1 and W2 of WH and R1 and R2 of RH. All facilities except P1 had the activity space for rehabilitation and amusement. Especially in N3, which has 400 tenants, there are rich activity spaces. W1 and W2 have such facilities on the same site. The site has six WH and a common activity center: the center has theater hall with 300 seats, cooking room, and construction room, etc. The advantage is that it became easy to offer the enhanced activity by efficient management of large-scale facilities was observed.

<table>
<thead>
<tr>
<th>No. of people per unit</th>
<th>Spaces of unit</th>
<th>Common facility for tenant’s activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N1</strong></td>
<td>21 – 40</td>
<td>Dining cum daily space, NS</td>
</tr>
<tr>
<td><strong>N2</strong></td>
<td>30</td>
<td>Dining, living, NS</td>
</tr>
<tr>
<td><strong>N3</strong></td>
<td>30</td>
<td>Dining cum day space NS</td>
</tr>
<tr>
<td><strong>P1</strong></td>
<td>48</td>
<td>Dining cum day space NS</td>
</tr>
<tr>
<td><strong>P2</strong></td>
<td>32 – 35</td>
<td>Sofa space, NS</td>
</tr>
<tr>
<td><strong>W1</strong></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>W2</strong></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>R1</strong></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>R2</strong></td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Table 3-4 Facilities Composition*
3.2.3 Room Composition

1. **Number of bed per a room.** Comparatively small-scale rooms of about six bedded room were often provided in N1, N2 and N3 of NH and W1 and W2 of WH, and a number of private rooms had been provided in N1. There are large rooms of 12 bedded or more in P1 and P2 of PH and R1. (photo. 4) A small-scale room gives homey atmosphere and large-scale rooms have advantage to decrease costs and to enable easiness for observation and nursing.

2. **Area per a person.** The area per a person in the room was calculated. The area of 5m² or more is provided in NH and PH: N1, N2, N3, P1 and P2, and the area of around 3m² is provided in W1 and W2 of WH, and the area of 4.6m² is provided in R1 where there are a numbers of beds in a rooms. Smaller area of the room contributes the large number of people’s accommodation and decreasing cost, though larger area of the room contributes to creating good environment for the tenants; living and nursing thought that it is the difference of the main target of each facilities type.

3. **Wall.** The room walls were able to be classified into the standard wall, the half-wall, and the wall with windows, and the clear tendency by the facilities type it was not apparent. The half-wall were seen in N1, P1, P2, W1 and W2: the walls are of good prospect, good ventilation and low-cost. The walls that were able to offer the homey scale were seen N3, W2, and R2, and the walls with windows that were able to offer both them were seen in N2 and R1.

4. **Furniture.** No piece of furniture was prepared in the bed circumference in all facilities excluding the storage furniture. As for N2 facility, the best storage furniture with the expression of the private property was provided. In other facilities only a small storage furniture was provided; up to height at the waist level, and the expression of the private property that showed individuality was hardly observed. Moreover, there was no storage furniture in the surrounding of the bed and the room in P1, and individual storage space was provided collectively in the room in W1 and R1.

5. **Curtain.** The curtains for beds were only provided in all of NH intended for the elderly and the dementia, a dementia unit of P2, and a more serious psychiatric unit of P2. It is thought that the concept of the privacy protection to the patient of the psychiatric and the intellectual disability is weaker than that of the elderly and the dementia.
### Table 3-5 Room Composition

<table>
<thead>
<tr>
<th>No. of bed in a cubicle</th>
<th>Area per person (m²)</th>
<th>Wall</th>
<th>Furniture around bed</th>
<th>Curtain</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>3-8</td>
<td>5</td>
<td>Half</td>
<td>Small storage furniture</td>
</tr>
<tr>
<td>N2</td>
<td>2-6</td>
<td>5.5</td>
<td>With windows</td>
<td>Wooden storage furniture</td>
</tr>
<tr>
<td>N3</td>
<td>1-6</td>
<td>5.8</td>
<td>Standard</td>
<td>Small storage furniture</td>
</tr>
<tr>
<td>P1</td>
<td>12</td>
<td>5.8</td>
<td>Half</td>
<td>-</td>
</tr>
<tr>
<td>P2</td>
<td>4-20</td>
<td>6.75</td>
<td>By building shape</td>
<td>Small storage furniture</td>
</tr>
<tr>
<td>W1</td>
<td>6</td>
<td>3.3</td>
<td>Half</td>
<td>Small storage furniture</td>
</tr>
<tr>
<td>W2</td>
<td>3-10</td>
<td>3.7</td>
<td>Standard and Half</td>
<td>Small storage furniture</td>
</tr>
<tr>
<td>R1</td>
<td>18, 12</td>
<td>4.6</td>
<td>Half</td>
<td>Small storage furniture</td>
</tr>
<tr>
<td>R2</td>
<td>6-8</td>
<td>3.1</td>
<td>Standard</td>
<td>Small storage furniture</td>
</tr>
</tbody>
</table>

#### 3.2.4 Common feature of the facilities

The survey identified some features that are common along most of the homes.

1. **Large-scale facilities planning.** Most of the facilities have around 200 beds, however N3 is more large-scale facility, and it has 400 beds. It was thought that it is the proper scale in Singapore, because 80% of the people live in the high rise apartment building of the public management and the country is densely populated.

2. **Foreigner staff dormitory.** Most of the care staff consists of people from abroad, therefore the foreigner dormitory is established on the top floor or part of area in each floor. It has not only the role of providing housing for the foreign staff, but also the role of giving safety for tenants because there are a number of the staffs in facilities at nighttime to serve for emergencies. The reason for this feature is that the country is positively accepting the foreign workers and Singapore is multi-racial country.

3. **Plan related to climate.** Air-conditioning is not often installed in the tenant’s area. There are plenty of areas where wall is not provided for cost saving and ventilation reasons. There are a number of facilities that value ventilation for comfortable environment and hygiene.

#### 3.2.5 Survey Findings

The full Report on 9 Existing Nursing Homes in Singapore is attached in **Appendix C**.

The Study findings include the following:
As 80% middle and lower income Singaporeans live in mid and high rise public-funded and private housing having 200 beds and in nursing home (N3) with 400 beds in public is the norm in ‘land-hungry’ Singapore. Also foreign staff are housed in dormitory on the last or other floors and they do provide help during emergency at night. Suitably-scaled facility has enhanced amenities and comprehensive communal activity space.

Climatic considerations given in the design, such as natural cross ventilation and natural sunlight protected and shaded respectively, are much valued in homes due to Singapore’s hot and humid climate. It explains the absence of air-conditioned environment and partition in fully public-funded wards except where they are required to meet medical conditions. (Figure 3-2)

The planning of nursing homes for the elderly and the dementia homes generally differs from psychiatric and mentally disturbed. The designs often do not follow the needs of nursing requirements and preferences for psychiatric and dementia although residents of various characteristics do co-exist, as in N3, P1 and P2.

No organized ward layout is found in W1, W2, R1 and R2. Large-sized wards, such as P1 has 48 beds and others have 30 plus beds.

P1 and nursing homes (N1, N2 and especially N3 with 400 beds) have ‘better’ facilities and more areas for dining, day space and living environment. (Figures 3-3)

Dining cum MPH is provided in W1 and W2 while none in R1 and R2. Activity space for rehabilitation and amusement is provided in all the homes except P1. The remaining 6 welfare homes share a common activity center together with 300 seats theater, a cooking room and a meeting room. (Figure 3-4)

Area per person varies, 5m$^2$, 3m$^2$ and 4.6m$^2$ in varied space situations like small-sized 6 beds (P1, P2) and large numbers (12) of beds in R1. Specifically for P2, even though the area per person is among the highest, it is not fully utilized by the use of substandard hospital beds. (Figure 3-5)

Elements, such as walls, half walls and walls with windows are used in the homes to meet different purposes and reasons. Curtain and storage furniture are also used in some facilities. (Figure 3-6)
• Ward which is planned exclusively for residents to sleep is also used as dining and activity space.

• Healing garden affords residents, regardless of age, to spend their time joyfully during their convalescence in the home.

![Figure 3-2 Absence of Air-Conditioned Environment and Partition (N1)](image1)

![Figure 3-3 Good Quality Dining Cum Day Space (N3)](image2)

![Figure 3-4 Dining Hall Cum Multi-Purpose Hall (W1)](image3)

![Figure 3-5 Spacious Area not Utilized by the Use of Substandard Hospital Beds (P2)](image4)

![Figure 3-6 Storage Furniture and Property (N2)](image5)

An interesting feature found in 2 of the nursing homes was unanimously found to be critical in solving the maneuvering of the patients within the homes by the project team, the handicapped
access ramp. Thus these 2 homes were further examined. This survey focused on specific design elements such as ramps and dining areas.

<table>
<thead>
<tr>
<th>Name of Facilities</th>
<th>Tai Pei Social Centre (R2)</th>
<th>Sun Love Homes (P2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established Year</td>
<td>1998</td>
<td>2005</td>
</tr>
<tr>
<td>Capacity</td>
<td>132 beds</td>
<td>208 beds</td>
</tr>
<tr>
<td>Overview of Residents</td>
<td>Intellectual Disorder 15-65 years old</td>
<td>Psychiatric, dementia 15 types</td>
</tr>
<tr>
<td>Length of ramp (m/storey)</td>
<td>46.0m (36.0m)</td>
<td>42.0m (36.0m)</td>
</tr>
<tr>
<td>Floor to floor height</td>
<td>3.0m</td>
<td>3.0m</td>
</tr>
<tr>
<td>Ramp gradient</td>
<td>1:12</td>
<td>1:12</td>
</tr>
<tr>
<td>Width of ramps</td>
<td>1.9m</td>
<td>1.2m</td>
</tr>
<tr>
<td>Operational methods of ramps</td>
<td>Only staff. Residents are not permitted to use</td>
<td>Staffs and Residents use everyday</td>
</tr>
<tr>
<td>Existence of Doors</td>
<td>With lockable doors on each floor</td>
<td>With lockable doors on each floor</td>
</tr>
<tr>
<td>Overview of Ramps</td>
<td>The ramp is used only by staff to hang the laundry on the roof</td>
<td>The daily use can facilitate emergency response</td>
</tr>
<tr>
<td>Disadvantages / Countermeasures</td>
<td>Inclination is steep for those using wheelchair. Since there is no roof, the floor is wet by the rain. The sunlight enters directly.</td>
<td>The Ramp is often crowded due to the narrow width. It's difficult to pass by one another</td>
</tr>
<tr>
<td>No. of Storeys</td>
<td>A basement floor, 3 Floors above</td>
<td>6½ floors above ground</td>
</tr>
<tr>
<td>No. of Residents</td>
<td>2nd storey 63 (male) 3rd storey 67 (female) Total 130</td>
<td>Total 208</td>
</tr>
<tr>
<td>Dining area</td>
<td>1st storey- 132 residents 3rd storey - 150 residents max.</td>
<td></td>
</tr>
<tr>
<td>Area m²</td>
<td>320</td>
<td>450</td>
</tr>
<tr>
<td>No. of staff</td>
<td>40 (Total)</td>
<td>75 (nursing only)</td>
</tr>
<tr>
<td>Staff to Residents Ratio</td>
<td>Daytime 1:4</td>
<td>1:3</td>
</tr>
</tbody>
</table>

Table 2-6 POE on Common Space: Ramp, Dining Area, and Ward

The findings are:

- P2- Psychiatric Nursing Home, a six-half storey facility is the first purpose-built nursing home for psychiatric (90%) and dementia (10%) residents of both sexes. It provides lift, stairs and ramp connections from wards to common spaces including to the dining and MPH.
- P2’s ramp of 1.2 meters is located indoor and residents and staffs use it daily although it is difficult for a person to pass by another when the ramp is packed. (Figure 3-7)
- R2- Residential Home is for residents from 15 years old to 65 years old with intellectual disability. Dining hall is on first storey and faces an internal landscaped area and an opened external for natural cross ventilation. It is also used as a multi-purpose space when not in use for dining. Activity rooms for rehabilitation are located on 2nd and 3rd storey.
- No roof is provided to the well located 1.9 meters wide ramp of R2; it has a 1m high parapet with no window and the floor gets wet when it rains and becomes slippery. It is not often used by residents as the access-doors are normally locked. (Figure 3-8)
CHAPTER 3
EXISTING PUBLIC NURSING HOMES IN SINGAPORE

Figure 3-2 1.2 Meters, 1:12 Ramp In P2 – Covered Ramp – Located Too Close to Main Lobby/Public Lift

Figure 3-3 1.9 Meters, 1:12 Ramp in R2 with No Roof

Figure 3-4 Dining Area in P2 – Segregated Male-Female in Dining Area – Different Dinning Hours

Figure 3-5 Cross-Ventilated Dining – Day Space in R2 – Flexy Arrangement for Multifunctional Usage
<table>
<thead>
<tr>
<th>Home/Centre</th>
<th>Positive Points to adopt</th>
<th>Areas to avoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Lions Home</td>
<td>• Nice courtyard with waterfall.</td>
<td>• Nurse counter at corner/entrance should be near activity areas - counters also too high</td>
</tr>
<tr>
<td></td>
<td>• ‘Bus stop’ for dementia patients, ‘interactive’ elements.</td>
<td>• Courtyard design - inadequate protection of corridors from rain</td>
</tr>
<tr>
<td></td>
<td>• Visitors Lounge with seating.</td>
<td>• No visitors’ toilets at L1 - entrance level.</td>
</tr>
<tr>
<td></td>
<td>• Activity space at every ward level well linked to dorm.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Layout of dorm facilitates easy conversion of wards to quarantine areas during crisis.</td>
<td></td>
</tr>
<tr>
<td>2 Apex Harmony Lodge</td>
<td>• Well-designed outdoor gardens, e.g. Sensory Garden, pavilions and walking path.</td>
<td>• Common activity areas in dorms are too small</td>
</tr>
<tr>
<td></td>
<td>• Activity Balcony /Decks on upper levels located beside indoor activity areas.</td>
<td>• Dorms are dark and not well ventilated.</td>
</tr>
<tr>
<td></td>
<td>• Parapet/railings at outdoor decks camouflaged with plantings.</td>
<td>• Rooms look cramped.</td>
</tr>
<tr>
<td></td>
<td>• Multi-purpose hall for meetings, events and activities use. Versatile and with garden</td>
<td></td>
</tr>
<tr>
<td></td>
<td>views.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Each ward has cozy visitor’s room.</td>
<td></td>
</tr>
<tr>
<td>3 Peace Haven Nursing Home</td>
<td>• Open pantry for residents to help themselves.</td>
<td>• Courtyard design invites rain.</td>
</tr>
<tr>
<td></td>
<td>• Well-designed dining area which feels like a cozy restaurant.</td>
<td>• Design details leads to difficult maintenance.</td>
</tr>
<tr>
<td></td>
<td>• Reception functional</td>
<td>• No proper staff area at every level.</td>
</tr>
<tr>
<td></td>
<td>• Well positioned.</td>
<td>• Nursing floor - many blind corners.</td>
</tr>
<tr>
<td>4 Hougang Care Centre</td>
<td>• Common activity areas very good.</td>
<td>• Holding room beside activity area.</td>
</tr>
<tr>
<td></td>
<td>• Variety of activity areas e.g. food corner, painting corner, thrift shop etc.</td>
<td>• Spirituality Hall too large and hardly used.</td>
</tr>
<tr>
<td>5 Sunlove Home</td>
<td>• Internal ramp is functional and well used.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Internal space bright and cheery. Dorms look into courtyards.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dorms have &quot;nocturnal paths&quot; for wanderers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Workshop and Dining Hall linked by ramps and well used.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Laundry area at roof facilitates drying of clothes.</td>
<td></td>
</tr>
<tr>
<td>6 Simei Care Centre</td>
<td>• Well-lit and ventilated.</td>
<td>• High partition and wall in rooms.</td>
</tr>
<tr>
<td></td>
<td>• Well laid out central nurse station, isolation room and duty room.</td>
<td>• Railings are too low (less than 1 m)</td>
</tr>
<tr>
<td></td>
<td>• Outdoor basketball court on podium roof deck.</td>
<td>• Redundant movable partitions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No homely feel.</td>
</tr>
<tr>
<td>7 Pelangi Village (Tembusu Home)</td>
<td>• Well organized medication room.</td>
<td>• Dorms layout disorganized.</td>
</tr>
<tr>
<td></td>
<td>• Pockets of recreational space e.g. Reading corner.</td>
<td>• Rains fall into the outside and inside of the corridors.</td>
</tr>
<tr>
<td></td>
<td>• Indoor gardens.</td>
<td>• Very caged-up feeling.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Dining hall is congested and dark.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Halal kitchen - provided but not use.</td>
</tr>
<tr>
<td>8 Econ Nursing Home</td>
<td>• Reception well designed, warm and welcoming.</td>
<td>• Staff welfare given low priority.</td>
</tr>
<tr>
<td></td>
<td>• Bed with a view of external garden.</td>
<td>• Dorms are small, beds too close</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Only 1 lift doubling up as visitor and service lift.</td>
</tr>
<tr>
<td>9 Tai Pei Social Service</td>
<td>•</td>
<td>• Very utilitarian look.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No activity area for non-ambulant residents.</td>
</tr>
</tbody>
</table>

*Table 3-7 Summary of the Points to Be Adopted and Avoided*
3.2.6 Conclusion

The architectural planning greatly differed in nursing homes for the elderly and the dementia from those facilities for psychiatric and mentally disturbed. Nursing homes had facility compositions for living environment as in dining room and day space in the unit with more floor areas. However, it is to be noted that with the exception of only no facilities following the rule of the guideline of 6m² per person. It has been observed that there are plans without enough space and furniture in bed surroundings for individuals. In the case of facilities with various patient symptoms, the architectural plans do not correspond to the nursing plans because architectural plans are quite uniform in all units. In facilities in Singapore there is comparatively of large-scale facilities provided to enable more extensive activities due to the benefits of large-scale.

A summary on the findings that were found to be critical for a good nursing home and were used for the designing of the new 300-Bedded 7-Storey High-Rise Psychiatric Nursing Home is listed below:

**Operational:**

(1) Patient-centric perspective (Flow and Safety)

(2) Staff-centric perspective (Efficiency)

(3) Safe and disabled friendly

(4) Low maintenance

**Spatial design:**

(1) Facilitates efficient workflow

(2) Allow easy supervision of patients

(3) Promote good airflow (natural ventilation)

(4) Ample activities areas

(5) Safety features

(6) Homeliness

As a result of the study, the following recommendations were made:
- Consideration of flexible plan that allows changes of the room layout and bed configuration to cope with different resident’s disabilities and illness, and /or building with flexi-different sections to deal with severe outbreaks.
- Investigation on the usefulness of ramp, its optimal slope and width for resident’s use including those on wheel-chair. Also, on resident’s essential needs including furniture and curtain
- The common spaces (of ramp, dining area and healing garden etc.) are recommended to be integrated to achieve universal and sustainable ways of living, working and producing.

For the Summary Report on 9 Existing Nursing Homes in Singapore, refer to Appendix C.

The findings of the survey on the existing homes, along with the adoption of the best attributes of the Japanese nursing homes and hospitals (Chapter 2), were used in the design process of the new 300-Bedded 7-Storey High-Rise Psychiatric Nursing Home. The case study of the new nursing home is presented in Chapter 4.
References


All Saints Home (Yishun) (2016). Retrieved from allsaintshome.org.sg


Director of Medical Services. Ministry of Health, Singapore (1993). *Guidelines under the Private Hospital and Medical Clinics Act (1980) and Regulations (1991)*, 1st Editions,


CHAPTER 4

CASE STUDY OF THE NEW 300-BEDDED 7-STORREY HIGH-RISE PSYCHIATRIC NURSING HOME, SINGAPORE

The Project was first conceived in 2009 when the Ministry of Health (MOH) acknowledged Singapore’s growing and aging population. Demand for long-term residential psychiatric care was expected to grow by 8% (+67beds) by 2011. The 3 existing psychiatric in Singapore at that time were already operating at full capacity. By 2012, the total bed shortfall was projected to reach 264 beds. MOH would develop the new home and fund 100% of the development costs. The Psychiatric Nursing Home’s operations would be contracted out via a competitive Request for Proposal (RFP) open to both voluntary welfare and private organizations and would be a subsidized nursing home facility providing long-term care for stabilized psychiatric patients. The new psychiatric nursing home is located within the tenanted site of Buangkok Medical Park with a site area of 0.44ha. A total of 300beds will be housed within the new facility with four main groups of patients mix.

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected Demand</td>
<td>846</td>
<td>869</td>
<td>891</td>
<td>913</td>
<td>934</td>
</tr>
<tr>
<td>Current Demand</td>
<td>649*</td>
<td>649</td>
<td>649</td>
<td>949</td>
<td>949</td>
</tr>
<tr>
<td>Shortfall based on current supply in 2009</td>
<td>-197</td>
<td>-220</td>
<td>-242</td>
<td>-264</td>
<td>-285</td>
</tr>
<tr>
<td>Change in Supply</td>
<td></td>
<td></td>
<td></td>
<td>New 300-beds PNH</td>
<td></td>
</tr>
<tr>
<td>Shortfall/ Excess based on planned supply</td>
<td>-197</td>
<td>-220</td>
<td>-242</td>
<td>36</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 4-1 Demand and Supply Projections

Note: Projected and Current Demand reflect that over the years from 2009 till 2013 the cumulative total had reached 285, thus the need to plan and built a new home of 300beds by 2013 was justifiable.

Data from Ministry of Health/ Institute of Mental Health

A design with enhancing space and creative elements that are conducive to reduce residents' agitated behavior and psychological problems is specially called for. Also a simple creative design approach was required to enhance and benefit residents using walker or on wheelchair. The other central design issues were the disposition of the wards, the dining hall, and central garden over the 7-storey structure; and the navigation routes of the residents and the caregivers from each level to or from the wards, dining area and the healing gardens.
4.1 Design brief

The home, funded by part of Government's 'boost' fund of $120 million (Daryl, C., 2010) to healthcare facilities, had to be a cost effective healthcare nursing facility in land scarce Singapore. It was the first in its effort to provide better built environment to meet the specific needs of Singapore’s psychiatric and dementia. It mandated that the psychiatric nursing home was to provide and support the long-term care of the residents who are with stable psychiatric illness, to meet their safety, changing needs and graceful aging. It had to provide a suitable environment for the caregivers and care-providers to achieve satisfaction and safety at work. It had to be constructed under a strict budget and to adhere to specific guidelines and all other generic rules and regulations.

a) Information + Timeline

Site Area: 047 ha approximately
Gross Plot ratio: 1.9
Gross floor area: 9725m²
Car park: 1520m² for 38 lots
Total built area: 11245m²
Bed component: 300
Completion date: Approx. Aug. 2011
Operation date: Approx. Sept. 2012

Note: Site boundary subsequently extended by 4m to accommodate the 1.5m width 6-Storey ramp

b) Residents’ Mix

The 300 residents comprised the following mix:-

- 50% Ambulant but requiring nursing supervision
- 20% Non ambulant and requiring dependent nursing care
- 10% Ambulant but demented and requiring close supervision for symptoms like wandering behavior & confusion
- 20% Mentally or intellectually dull and have psychiatric illness

*Figure 4-1 Proposed Residents’ Mix*
4.1.1 Design Concept/Philosophy

The overarching emphasis of the concept and philosophy is as shown in Table 4-2. The principal attributes framed the desired outcome of the 300 bedded 7-storey psychiatric nursing home. The specifics for the exterior and interior of the home are mandatory and had to achieve specific guidelines with strong emphasis on health and safety for both patients and staffs. These are over and above all other generic rules and regulation applicable to similar projects.

<table>
<thead>
<tr>
<th>Principal Attributes</th>
<th>Exterior</th>
<th>Interior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient-centric perspective (Flow and Safety)</td>
<td>Welcoming</td>
<td>Homely</td>
</tr>
<tr>
<td>Staff-centric perspective (Efficiency)</td>
<td>Embrace nature</td>
<td>Facilities efficient workflow</td>
</tr>
<tr>
<td>Engage 5 senses (Feel, Sight, Hear, Smell and Taste)</td>
<td>Tranquil, serene and warmth</td>
<td>Allow easy supervision of patients</td>
</tr>
<tr>
<td>Safe and disabled friendly</td>
<td>Promote outdoor activities</td>
<td>Promote good airflow (natural ventilation)</td>
</tr>
<tr>
<td>Low maintenance</td>
<td>Observe safety features</td>
<td>Ample activities areas</td>
</tr>
<tr>
<td>Green mark certification</td>
<td></td>
<td>Staff resting areas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observe safety features</td>
</tr>
</tbody>
</table>

*Table 4-2 Vision of MOH/IMH for New Nursing Home*
### Table 4-3 Summary of Total Built-Up Area and Site Data

<table>
<thead>
<tr>
<th>Area</th>
<th>GFA (m²)</th>
<th>GFA (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed Complement</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Types of Areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inpatient Accommodation (e.g. wards)</td>
<td>5,055</td>
<td>52%</td>
</tr>
<tr>
<td>Clinical Support Services</td>
<td>100</td>
<td>1%</td>
</tr>
<tr>
<td>General Support Services (e.g. Admin Offices)</td>
<td>96</td>
<td>0.99%</td>
</tr>
<tr>
<td>Operational Support Services (e.g. housekeeping and catering services)</td>
<td>630</td>
<td>6.48%</td>
</tr>
<tr>
<td>Training and Education (e.g. meeting rooms)</td>
<td>40</td>
<td>0.41%</td>
</tr>
<tr>
<td>Staff Welfare (e.g. staff night duty room)</td>
<td>562</td>
<td>5.78%</td>
</tr>
<tr>
<td>Others (e.g. prayer room, retail)</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>NET FLOOR AREA</strong></td>
<td>6,483</td>
<td>66.66%</td>
</tr>
<tr>
<td>Circulation (20%)</td>
<td>1,297</td>
<td>13.34%</td>
</tr>
<tr>
<td>Circulation / M&amp;E Services (30%)</td>
<td>1,945</td>
<td>20%</td>
</tr>
<tr>
<td>Circulation Area etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL GFA</strong></td>
<td>9,725</td>
<td>100%</td>
</tr>
<tr>
<td>No. of Car park Lots</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Basement Car park</td>
<td>1520</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL BUILT UP AREA</strong></td>
<td>11,245</td>
<td></td>
</tr>
<tr>
<td>GFA/patient (m²/bed)</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Total Built Up Area /patient (m²/bed)</td>
<td>37</td>
<td></td>
</tr>
</tbody>
</table>

The ‘strategic plan is based on the medium and long term needs of an organization determined by market / needs analysis and are also based on the organization’s mission goals as well as facility audits’. (Presier and Schramm, 1997). The ‘conceptual framework for building performance evaluation’ had also been included. (Presier and Visher, 2005) The Ministry of Health and the Institute of Mental Health’s Action plan had included ‘the integrative framework for building performance’ with ‘strategic planning, programming, design, construction, occupancy and adaptive reuse / recycling’.

The design of health facilities has long focused on the functional necessities of the process of delivering health care. The opportunity now exists to formulate new action, to meet the new circumstances and the demands, to derive new insights as well as to obtain fresh resources of qualitative and quantitative intelligences.

Building on HELP model (Figure 1-5), the process of evidence based design, with its inherent rigorous approach, seeks, institutes and investigates, eventually giving rise to program that informs the project’s goals and its guidelines. The qualitative and quantitative information gathered from the user participation provide time for the team to know, learn and analyze the existing cultures of the organization and its strategic objectives. Most importantly, it allows flaws to be reviewed, discovered and be condemned before arriving with a good solution for
exploration of innovative ways to improve process in care delivery. In the process, it gives rise to a fresh model of public and voluntary funded nursing home. The Ministry of Health / Institute of Mental Health (MOH / IMH) Design Philosophy defined that the overall design of nursing home shall make provisions to:

- Provide long-term care for residents with stable psychiatric illness.
- Support the residents’ changing needs to allow aging - in place and provide an environment - contributes to quality and affordable psychiatric care;
- Balance reasonable cost, great flexibility and adaptability, easy maintainability and functional effectiveness.
- Provide a secured and safe environment for both staff and residents; and
- Invoke the five senses of humanity throughout the continuum of care giving

4.2 Literature Reviews

Reviews of related papers and articles were carried out for the better understanding of the psychological distress of dementia and other psychiatric patients and the psychological effects of living in high-rise built environment. Search on the common characteristics of dementia and psychiatric patients was conducted to clarify the limitations of their living in high-rise built environment and to identify their physical and psychological needs of their daily activities. Two standards were used:

a) A Guidebook on Nursing Homes (2002), which provides standard reference source, guide and checklist to organizations for the establishment and management of nursing homes, on facilities and space, furniture and equipment and samples of organization’s mission, philosophy and objectives to better understand the vision and objectives of the Ministry of Health / Institute of Mental Health (MOH/IMH)

b) Enhanced Nursing Home Standards by Nursing Home Standards Workgroup (January 2014), which provides the enhanced standards underlining the importance of preserving the dignity of care for residents, requiring nursing homes to ensure that the dignity of the individual is respected, requiring that physical restraints to be used on patients as the last resort and attending to the psychosocial well-being of patients.

Prior to commencement to design, and for the Team’s better appreciation and understanding the followings concepts led by the principal consultant were examined:
a) **Movement**: “the act or process of moving esp. change of place or position, or posture.” (Webster, 2016) In “Movement with Meaning”, Barbara Larsen states amongst other relevant issues also alludes that during Movement in motion will give rise to (Larsen, 2006):
- “Activities that stimulates all five senses to enhance wellbeing of older adults”
- “Gentle dance movement, yoga inspired poses, and breathing exercise with music, poetry and specific sensatory activities.
- Participants become focused in the present through total immersion in short, concentrated exercises that stimulate physical, mental and sensory awareness.”

b) **Ramp**, “a slope that joins two parts of floor, etc. when one is higher than the others. (Oxford, 2016). A simple description of a ramp is an inclined plane that connects floors. Such ramp is accepted by the authority for use by less able bodied person on wheel-chair when the gradient is 1:12 (or gentler) with level plane of 1.2m both directions, with at maximum every 9m (Code on Accessibility in the Built Environment 2013).

Unfortunately, ramp has often been in the thought of an untutored person that it is an inefficient mean of circulation, much longer distance travel, a waste of space, impractical and unimportant. Especially such person would maintain that there are stairs and lifts available as vertical means of circulations. Fortunately the true beauty, use and benefit of ramp is best demonstrated, shown and as adopted in Le Corbusier’s - Villa Savoye “one of the design features is ramps – a non-traditional transitions between floor” and “the most interesting design is the roof garden and the interior space, they connect together with ramps”.

c) **Motivation** is defined as the **Direction** and **Intensity** of one’s effort” (Sage, 1977). **Guided Motivation** is guidance or assistance given to a resident in need for his /her enjoyment during his/her stay in the home till the end of stay in the Home. The care-providers, caregivers and all those involved are tasked to provide and are obliged to do so.

d) **Hyperlink** “of ideas, expertise and ways of making leads to...new thinking and progressive outcome.” Hyperlink in Architecture and Design instigates, investigates and interpolates, then creates an integrated supportive design solution. Consequently hyper linking Movement to Dining and to the Environment is a progressive forward solution “of new development, enlarging experience and understanding of the world around us”. Hyperlink draws its meaning and strengthen from Design theorist, Clive Dilnot’s articulation “the internal world of the design profession, but the wider social world that produced the determining circumstances within with designers work, as well as the conditions that lead
to the emergence of designers” (Dilnot, 1989) and from Theorist, Ezio Manzini’s to “regenerate the context in which to live” (Manzini, 2002) is to design within a social context, to achieve more sustainable ways of living, working and producing and to “read the space of flow and the space of networks (as a whole)” Hyperlinks: Architecture and Design (Zoe and Joseph, 2011).

Hyperlinks also acts ‘as the cement’ that binds the best physical design with the relevant social and environment - to design and produce the best sustainable ways of living, working, and participating within the Supportive Design-Built-Environment.

e) Healing Environments. Van Nostrand Reinhold (Reinhold, 1992) alludes to “the major benefit a therapeutic, supportive environment is its immune – enhancing effects, which are complementary to the effect of drugs and medical technology and foster the process of recovery” as an interpretation of the theory of Supportive Design.

f) Healing garden / Green space is effectively facility design for relaxing and improving natural healing. According to Cooper Marcus, C. (2007) Healing Gardens in Hospitals. Design and Health, January. Vol. 1, issue 1 and other researchers “regardless of age, location, and illness, the most prefer environment is the access to the nature” and by ‘hyperlinking’ the Ramp (and use for daily exercise and night –walk) and to the Main Dining and Multi – purpose Hall (MPH) (will assist, tighten and cause them to be seamless, meaningful and a creative whole.

4.3 Design Process

Design-Environment Group, Architects won the design competition and was awarded the project on June 2010. MOH has tasked IMH to be the lead agent, appointed the professional team, of Civil and Structural (C&S), Mechanical and Electrical (M&E) lead by the Architect and appointed Project Manager (PM) in developing this home.

Institute of Mental Health (IMH) was also appointed to provide specialization consultation services to the team including facilitating clinical care at the Psychiatric Nursing Home (PNH) Institute of Mental Health (IMH ) gave an outline of the proposed home and also advised that in the run up to the design and conceptualization all including IMH and the focus group would work closely together to ensure that the home aligned with the strategic focus to provide an integrated, seamless and patient-centric care delivery.
Upon appointment, the Team of Professional Consultants with the Ministry of Health/ Institute of Mental Health and the Project Manager agreed to the program and course of action and on the Methodology for the deployment and distribution of the members of the User-Participation Group and the Team of Professional Consultants on visits to Nursing Homes and Psychiatric Homes, and meetings for Focus Group Discussion, Long-Stay Wards’ staff interview and Process Preparation Workshop (2p).

This was in line with the Ministry of Health’s mission to provide person-centered quality of care to psychiatric residents and a conducive environment for staff to work the Vision of an appropriate environment that meets the needs of stable psychiatric residents.

The Kick-off meeting was held on 28 June 2010. There would be weekly Project Coordination meetings with sub-working group until the scheduled design sign-off on 27 September. The Design process from inception until the final design sign-off is shown in Figure 4-3.

A Scenario Based Team Design (SBTD) was structured consisting of the team of consultants and key members from the Ministry of Health and the Institute of Mental Health. SBTD was tasked to seek fresh insights and perspectives on the needs, wants and expectations of psychiatric residents, and to provide conducive environment to caregivers and care-providers for them to achieve efficient and quality service without unnecessary wastage of effort and time. It was also to finalize the findings from the existing 9 nursing homes, to upgrade the competition design brief, to finalize the concept with the client on design philosophy together with the winning key principles of centricity, safety and security.
CHAPTER 4

CASE STUDY OF THE NEW 300-BEDDED 7-STOREY HIGH-RISE PSYCHIATRIC NURSING HOME, SINGAPORE

Figure 4-3 Design Process of the New Nursing Home
4.3.1 Survey on Existing Nursing Homes

A series of case studies were carried out on 9 privately operated nursing homes (Chapter 3). The objective of the case studies is to understand the relation of the operational aspect and the spatial layout of these nursing homes. From these understanding, a workshop was to be conducted to further-evaluate the findings to enhance the design brief of the project. The visits to Nursing Homes and Psychiatric Homes conducted over a period of 3 days provided in-depth understanding to the User-participants on the difficulties, merits and constraints of each Home. The knowledge gained by the user-participants was put to good use during the Focus Group Discussion that followed immediately on completion with the Institute of Mental Health-Long-Stay Wards Staff Interview. The main issues the surveys identified were:

1) Shortage of staff affects the control and monitoring of residents affects ideal layout;
2) Staff ratio to bed and residents type affects layout as a constraint and challenge in managing a Home especially for psychiatric home of the early and advanced dementia residents,
3) Impact on space configuration, simplicity of shape, color differentiation, visual control, proximity of facilities, danger of unprotected space, beauty, selection of plant and location.

Observations especially on Tai Pei Social Centre and Sunlove Home exemplified a strong interest and emphasis on the need to better what have been achieved on the following aspects:

1) Improved relationship of spaces, visual control of staff and residents within the wards,
2) Shade, natural light, active natural fenestration, skylight, meaningful courtyard,
3) Appropriate garden at different levels for different types of residents,
4) Safety and Security (not repressive and repulsive but ‘sweet’ and ‘gentle’),
5) Ramp for movement between floors and holding areas are necessary for the less ambulant residents,
6) Area for meditation and ‘departure’ ceremony from Home adjacent to area for holding the deceased,
7) Areas for flexible division for ad hoc and planned use,
8) Movement of food from Kitchen to different end destination,
9) Location of laundry and open air drying,
10) Community participation/communal activities and spaces,
11) ‘Real World’ needs and expectation of Residents/Care-providers and administrators,
12) Environment and Space for caregivers and volunteers,
13) Conductive, Caring and Complete Built Environment
4.3.2 User Participation

User Participation-contributions are critical, value-centric and resource of qualitative and quantitative information. Today’s User-participants, due to advancement in education, social and economic improvement recognize the challenges and issues they face, the specific needs, wants and expectations of themselves and the others. User participants, especially in the presence of peer group, are capable of significant contribution of ideas, when they are listen to, when they express how they feel and respond; and most importantly when they are made to feel “I am one of the users”. Their collaborative efforts, active involvements and sustaining commitments in the planning, design and management add value to the final outcome when it is properly organized, conducted and concluded.

The importance of gathering of intelligence cannot be neglected, underestimated and must be emphasized during the process of the design. While traditionally, it is true that the implementation of the Programming stage is the phase that shapes a project, this logic of jumping immediately into programming phase has to be challenged, as too often a new project is informed with data that is based on past references and previous perpetuated stale model.

In the case of the new nursing home, the majority of members in the User participation group (the Focus Group participants) was invited from the healthcare of the social service sector. Representatives from the Ministry of Health, the Institute of Mental Health and the full Team of Professional Consultants, including the Project Manager, were also included. All the participants were selected for their experience and extensive knowledge in operating residential facilities, other related areas of healthcare and in the built-environment. The task was to gather views and ideas for ‘the creation of a new facility as the result of new insight that precedes the programming process.’ (Kumlin, 1995).

They were briefed that live-in residents were the main occupiers for the built-environment. That deliberations and discussions were not simple, linear and streamline, but were winding and repetitious series of conversations and drama with consultants linked to a concept of welfare driven emancipator rather than regulatory imperatives, in a creative and critical environment. They were to elicit feedback from care-providers on challenges in operating their residential facilities to achieve an integrated, seamless and patient-centric care delivery outcome during discussions in workshops.

They were to record the ideal facilities, workflow and the pitfalls for evaluation and adoption. They were most importantly told to recognize that caregiver were the eye, and the voice of the
live-in residents and they knew the needs, wants and expectations of each resident under their charge. In the course of their discussions they were informed and made aware that the current care plan in most nursing homes have regimented care plan, leaving residents of different abilities, with very little options to vary the routines.

The knowledge gained on the relationship of spaces and visual control of staff and residents within the wards, the concern and care on safety and security (clearly expounded in Japanese examples - Chapter 2), the movement of food from kitchen to different end destination, the choice’s location of laundry and need of open air drying, the beauty of community participation/communal activities and the required spaces for careers and volunteers, helped to formulate the ‘best to have’ ideal facility and with the best workflow at the end of the Design stage.

4.3.2.1 Focus Group Discussion (FGD)

Focus Group Discussion (FGD) was held on 14 and 15 July 2010. The FGD group would not be making decisions. They were invited by IMH to test out the client brief and see if the workflow worked. The final decision would be from the IMH. The FGD was facilitated by a senior staff from the healthcare of social service sector. She was responsible for sharing the design brief on the preliminary design concept of the proposed development. Subsequently, this would be followed by discussions to seek the views from the participants on the workflow and functional relationship of the proposed for the Home. The Focus Group’s discussions confirmed that current care plan in most nursing homes have regimented care plan, and left residents of different abilities, with very little options to varies the routines. The Focus Group had given a clearer picture on the operations of nursing homes and their needs. The main points from the 2 FGD are:

1st Focus Group discussion -14 July 2010

➢ Design Consideration/ Concept
  • Consideration of modern concept and of both staff and residents needs when designing.
  • Dorm design must be flexible, as it may not be catered for 50% male or 50% female.
  • Consideration of pandemic/ provision of isolation room for the resident is required.
  • Should consider open concept but with some segregation for privacy issue.

➢ Facilities to provide
  • To cater space for rehab as 50% ambulatory residents.
  • Facilities should be multi-purpose or allow for flexible usage.
• To cater facilities to allow quiet moment for residents.
• There should a separate room at the dorm for common activities (e.g. TV rooms).
• To cater nurse station near dorms so night duty nurse to attend to the resident's needs.
• Should have good way-finding so that resident will know where to go.

2nd Focus Group discussion -15 July 2010

➢ Design Consideration/ Concept
• Design should also consider the age group, gender.
• Should consider empowering the residents so that they will be independent.
• Design must take into consideration manpower issue.
• Male and female residents must be separated.
• Should be home away from home, not institutional.
• Should consider how to move residents in the case of emergency.

➢ Facilities to provide
• Good to have large area for exercise. Should have space for aimless wondering.
• Should have space for volunteers.
• Should have a space for mass activities.

4.3.3 Preliminary Design
The Scenario Based Team Design presented the 3 preliminary schematic layout based on their understanding of the client brief. The 3 approaches consisted of courtyard, compact and cluster layout plans. (Figure 4-4)

![Figure 4-4 3 Preliminary Schematic Approaches](image)

*Note:* 3 initial approaches were presented by the design team. The approach with the courtyard plan was selected as the basis for further development.
The courtyard plan was used as the basis for the development of 4 Options (Figure 4-5). The ramp-courtyard Option 1 from the 4 options was selected as the Preliminary Concept Design 1 to be developed with consideration to the Design Brief, its constraints and opportunities of the site, allowable gross floor area, the cost, time and budget; and the mix and the level of the residents on the respective floors.

Note: The ramp option was selected to be developed as the Preliminary Concept Design 1

The Preliminary Concept was adjusted to meet the requirements and in the Design Workshop held on 06 Aug 2010, the design to proceed with was confirmed (Figure 4-6). The selected design was developed and presented in the 2P sessions.
4.3.4 Process Preparation (2P)

A 2-day Process Preparation workshop was held to meet Ministry of Health’s mission - to provide person-centered quality of care to psychiatric residents, to have a conducive environment for staff to work, and to ensure an appropriate environment that meets the needs of stable psychiatric residents. The participants included nurses, designers, health care workers,
healthcare operators etc. The objective of the workshop was to re-evaluate the design brief through the inputs of all the participants and the findings of the operational aspect and the spatial layout of the existing nursing homes. Models adopted were: Kano Modeling, Care Plan Mapping, Detailing Core Features of Individual Facilities and Layout Design established. The 2P Session scheduled on 12 to 13 August 2010 Concept Plan would be showing the areas and spaces organization at the various levels in schematic outline. The concept plan would also cover the following key areas:-

a) Structural Grid Outline
b) Vehicular Ingress and Egress into the Site
c) Service Cores/Staircases, Toilets Locations and indicative locations for M&E Services Rooms
d) Building Setbacks and Car parking Provision
e) Schedule of Accommodation
f) Indications of A/C and N/V for all areas.

Figure 4-7 Team of ‘Process Preparation’ Participants and Professional Consultants

Team: Liew Doris (Workgroup Chairman), Lim Chee Ming, Yow Kah Lai, Chua Siew Hong, Wee Gerry, Mark Lilian, Tan Bhing Leet, Chow Tenny, Ang Ser Lee, Soh Hwei Lee, Low Min Hue, Ismail Suny Indra, Lim Yang Chue, Yeap Beow Im, Catherine Suyat, Tengku Abdul Rahman, Liu Xi, Chellaiyan Vinodha, Chan Seng Kee (lead DEG Architects), PML, DLS, Meinhardt, Amalia Huab (Facilitator)

The proposed psychiatric nursing home was to be built house 10% of Mentally Dull, 50% of Ambulant residents, 20% of Ambulant residents with Dementia and the balance 20% of Non-Ambulant residents thus: 4 Teams / Groups were organized to cover, review and to strategies on each categories: on Patient/Resident Profiling, Needs Definition, Mapping IDEAL Care Plan, Mapping Proposed Care Plan indicating facilities and Efficient Layout of Facilities. Also the
data from Table 4-4 and Table 4-5 which were provided by Ministry Of Health /Institute of Mental Health, were used.

**Note:** Normal daily activities of a nurse begins with the bathing of resident @ 5am and for non-ambulant @ 6am. Daily rigorous duties include 4 times movement of residents from various wards on different floors to the Cafeteria / Multi- Purpose Hall.
**Table 4-5 Patient Workflow and Movement to Dining Area**

*Note: Nurse daily workflow in support of different resident’s daily activities and movement. More activities needed for non-ambulant residents. Information obtained from Ministry Of Health /Institute of Mental Health*
4.3.4.1 Study Plan

a) Team #1 - Addressed the Needs of the Mentally Dull (MD). (30 residents)

The suggested level was 6th floor for Males. The profile of the Mentally Dull included food grabbing, being noisy, striping naked, misusing of toilets, the need for Activity of Daily Living (ADL), excessive water drinking, assaulting of people, shoulder rubbing, hoarding and throw items. The normal activities of daily living were their basic needs and habits; spacious toilet for assisted bathing, wide areas for supervised activities and dining within the ward (not mix with other residents), restricted access to pantry and water supply, anti-littering features, fixed furniture, therapy (comprising multisensory, music, PT, OT entertainment – television, picture books), nice clothing and social visits (performances by volunteers). These were best supported by ‘performer’ (items) - cordless phones to call home, Closed-Circuit Television (CCTV) for nurse monitoring- and ‘delighter’ items - Air-conditioned dorms and individual lockers.

The summary of facilities for the patients included spacious Day Space cum Dining, Nocturnal Space, Dormitory, Protected Indoor Garden, Isolation Room, Time-out Room with toilet, Toilets, Shower Rooms (and dressing area), sluice Room, Linen Room, Therapy Rooms (OT, Multisensory Room), Patient Pantry and Treatment Room. Facilities/utilities for Staff include Nurse Station, Staff Room with toilet, Staff Pantry, Cleaner Utility and Store Room.

Note: Team #1 studied the needs of the Mentally Dull (30 residents.) located on 6th floor
b) Team #2 - Addressed the Needs of the Ambulant Resident Category. (150 residents)

2nd and 3rd floors were planned for female and male ambulant residents. Resident’s profile was normal with relapse, unmotivated/withdrawn or patients who were capable of simple Activity of Daily Living. The basic needs were: participation in the activity of daily living, freedom to move about, given a variety of daily activities, staggered meal times with customized seats, personalized bed space (allowed to sleep on the floor), quiet corners, healing garden, time out room, outdoor/indoor games, public phone accessible and group psycho education session. These were supported by ‘performer’ items’:- Sundry store, outing, birthday party, own clothes, spiritual room, sensory room, “Residents” Committee, smoking corner, volunteers’ visit, activity rehab hub and more than one television channel as well as ‘delighter’ items’– air-conditioned dorm, canteen style/hawker food.

The summary of facilities included: day space, protected indoor garden, isolation room, timeout room with toilet, indoor protected garden, dorm, toilets, shower rooms, sluice rooms while for the staff the facilities and utilities included: nurse station and staff room with toilet and utility room and store room.

![Study Plan 2](image_url)

**Figure 4-9 Study Plan 2**

**Note:** Team #2 studied the needs of the Ambulant Residents (150 residents) located on 2nd and 3rd floor
c) Team # 3 - Addressed the Needs of the Ambulant with Dementia Resident Category. (60 residents)

1st floor were planned for male and female residents. (60) / (Geriatric) residents were those categorized as forgetful/disorientated, stubborn, easily bored, and have a high fall risk.

The basic needs and provisions for the residents were participation in the activity of daily living (assisted bath), pictorial signage, adequate lighting, safety features (railing, anti-slip flooring), diverse activities (social, recreational library, movies), space close to nature and freedom of movement, family visits and lockers for personal use. Together with the ‘performer’ items’ – aromatherapy (herb garden), reality orientation, home-like environment, safe kitchen, multisensory room, use of light to signal medication, meals, etc., and volunteer involvement and ‘delighter’ items’ – massage chair corner, gym (elderly-friendly), prayer room, pet corner and the internet corner.

The summary of facilities for residents consisted of:- day lounge, timeout room with toilet, dorm, toilets, shower rooms, sluice room, karaoke room, prayer room, clean linen room, therapy room (OT Room, Multi-Sensory Room), Reminiscence Room and wheelchair bay. Facilities for staff consisted of nurse station (night counter/reception), staff room with toilet, meeting room, cleaning/utility room and store room and a visitors’ room.

![Figure 4-10 Study Plan 3](image)

**Figure 4-10 Study Plan 3**

**Note:** Team #3 studied the needs of the Ambulant with Dementia Residents (60 residents) located on 1st floor
d) Team #4 - Addressed the Needs of the Non Ambulant Resident Category.

(60 residents)

5th floor was the proposed level for male and female wards. Non-ambulant residents were wheelchair or bed-bound, generally unmotivated and were required to be provided with the utmost comfort until end-of-life.

The basic needs for the resident were: adequate space around the bed, big assisted bathrooms, wider doors, safety and comfort, no delay in care needed, pressure relief, cot beds, therapy services, call bells, spiritual and emotional support, aids and equipment and multi-sensory facility and best supported by ‘performer items’ – entertainment (music, movies), celebration of birthdays and festive occasions, wall-mounted television with remote control, library (books and audio-visual), indoor and outdoor games, access to garden, variety of menu, aroma and pet therapy as well as ‘delighter items’ – phone calls/video calls, vibrating water bed, reflexology, massage, facial, water features and volunteer performances.

The summary of facilities for the resident was:- day lounge, end-of-life room, dorm, toilets, assisted bath rooms, sluice room, clean linen room, therapy room, visitors’ room, wheelchair bay while facilities for staff include nurse station (night counter/reception), staff room with toilet, pantry, meeting room and utilities to include the cleaner utility room and store room.

Figure 4-11 Study Plan 4

Note: Team #4 studied the needs of the Non Ambulant Residents (60 residents) located on 5th floor
4.3.4.2 Workshop Conclusions

Team #1 and Team #2 alluded to a homely environment where a resident sleeps with personalized bed-space and wakes up within flexible time and with options: to take nap, on food of his/her preference, to engage in recreational activities and to have flexible bathing time and durations.

Team #2 further added that the layout of the floor had to be planned for free and easy movement but ‘protected’ and secured with healing garden and suicide prevention items also provided. Agreed to locate the residents to levels 4 and 5 as they were ambulant and good for them as daily movement to dining area would provide with regular exercise.

Team #3 stated that the ward had to be made homely and therapeutic, serene and relaxing, orienting, safe (unobtrusive and elderly friendly), personalized, culturally appropriate, prosthetic environment. The layout plan to achieve ‘balance of ideals’ for residents and staff by including short link between the ward, the day space and the gym, providing prayer room for residents and multi-sensory room to stimulate their senses. Sufficient space and toilets would be most welcome.

Team #4 alluded to allow resident to have breakfast in bed, soothing music, efficient service, serenity and relaxing environment, unobtrusive and elderly friendly storage space, choice of food and late wake up time. The layout plan needed wide corridors for movement of bed wheelchair and residents/staff. Bathroom and toilet had to be sized for use by resident on trolley bed and wheelchair. Had to provide enclosable therapy room for karaoke, mahjong and television viewing; visitor lounge on each level, deceased holding room, individual bed curtain, personal bedside locker, indoor garden and greater numbers of medical equipment.

The 4 Teams concluded the study and summarized the findings (Table 4-6) for the team of consultants to develop the various plans for the penultimate plan/design of the new facility. It lead to the finalized parameters for the design (Table 4-7). Concurrently the 4 Teams completed the study on patient/resident profiling, needs definition, mapping ideal plan, mapping proposed care plan indicating facilities and efficient layout of facility and planned the study layout plan for each cohorts of residents. The participating group and the team of consultants then made a final review of the teams’ study.
## Table 4-6 Summary of Facilities Needed

Notes: * Treatment Rm for Ambulant patients is integrated in the Nurse Station*

*OT/PT Rooms for Ambulant and Dementia will be at Multi-purpose Hall*

<table>
<thead>
<tr>
<th>ISSUES</th>
<th>DECISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 Resident Mix and Ward Design</td>
</tr>
<tr>
<td>a.</td>
<td>Keep resident profile and percentage.</td>
</tr>
<tr>
<td>b.</td>
<td>Ward design to be generic and can cater to most demanding group</td>
</tr>
<tr>
<td></td>
<td>2 Wards</td>
</tr>
<tr>
<td>a.</td>
<td>2 wards per floor</td>
</tr>
<tr>
<td>b.</td>
<td>Adequate space for basic bedside activities.</td>
</tr>
<tr>
<td>c.</td>
<td>Can split dorms into 2 sections, eg. 12 + 18 or 15 + 15</td>
</tr>
<tr>
<td>d.</td>
<td>4 beds in a cluster with low partition to create “cubicles” (for isolation from cohort with infection)</td>
</tr>
<tr>
<td>e.</td>
<td>1.2m bed-to-bed spacing to meet licensing condition.</td>
</tr>
<tr>
<td>f.</td>
<td>Toilet/bathroom to be at rear of dorm, away from nurse station. Easy to access via dorm and day space.</td>
</tr>
<tr>
<td>g.</td>
<td>Explore sharing toilet with day activity spaces.</td>
</tr>
<tr>
<td>h.</td>
<td>Nurse station has to be near the services – isolation room / time out room / treatment room.</td>
</tr>
<tr>
<td>i.</td>
<td>Standard pressure isolation room with air conditioning and external exhaust fan</td>
</tr>
<tr>
<td>j.</td>
<td>Outdoor garden / activity deck beside indoor activity areas.</td>
</tr>
<tr>
<td>k.</td>
<td>No blind spots.</td>
</tr>
<tr>
<td>l.</td>
<td>* Provide deceased holding room</td>
</tr>
<tr>
<td>m.</td>
<td>* Provide staff pantry</td>
</tr>
<tr>
<td>n.</td>
<td>* Provide nocturnal space</td>
</tr>
<tr>
<td>o.</td>
<td>* Provide prayer room</td>
</tr>
<tr>
<td>p.</td>
<td>* Provide Visitors’ Room</td>
</tr>
<tr>
<td></td>
<td>These are new rooms not provided in the Schedule of Accommodations (SOA)</td>
</tr>
<tr>
<td></td>
<td>Care Model</td>
</tr>
<tr>
<td>a.</td>
<td>Ambulant residents allowed to roam freely outside wards</td>
</tr>
<tr>
<td>b.</td>
<td>Non-ambulant and dementia residents will have all activities within ward areas.</td>
</tr>
<tr>
<td>c.</td>
<td>Ambulant residents on lower floors to facilitate frequently daily movement.</td>
</tr>
<tr>
<td>d.</td>
<td>Dementia residents on lowest level for access to garden or upper floor with balcony / deck.</td>
</tr>
<tr>
<td></td>
<td>4 MPH</td>
</tr>
<tr>
<td>2 floors of activity zones:</td>
<td></td>
</tr>
<tr>
<td>•</td>
<td>1 floor Dining Hall with MPH (300m² – 200 pax dining or 300 pax event</td>
</tr>
<tr>
<td>•</td>
<td>1 floor OT, Group Therapy, Activity Rooms (100m² per room, 3 adjoining rooms convertible to 1 large hall)</td>
</tr>
<tr>
<td></td>
<td>5 Ramp</td>
</tr>
<tr>
<td>Ramp if provided, is to be within approved GFA. It has to be weather protected and should not be designed for residents to move in and out of building on every floor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 General</td>
</tr>
<tr>
<td>a.</td>
<td>Natural daylight and ventilation should be maximized and exploited</td>
</tr>
<tr>
<td>b.</td>
<td>There should no deep and dark internal areas – premises should be well-lit</td>
</tr>
<tr>
<td>c.</td>
<td>Staff toilet also as visitor toilet.</td>
</tr>
</tbody>
</table>

## Table 4-7 Finalized Design Parameters
The following recommendations are the final findings by the 4 Teams of Users-Participants tasked to re-evaluate the design brief with residents’ profile of on the conclusion of the 2-days’ workshop:

- Consideration of flexible plan that allows changes of the room layout and bed configuration to cope with different resident’s disabilities and illness, and/or building with flexi-different sections to deal with severe outbreaks.
- Investigation on the usefulness of ramp, its optimal slope and width for resident’s use including those on wheel-chair. Also, on resident’s essential needs including furniture and curtain.
- The common spaces (of ramp, dining area and healing garden etc.) are recommended to be integrated to achieve universal and sustainable ways of living, working and producing.

Gathering and moderating of views, exchanging and contributing of ideas adopted Post Occupancy Evaluation (POE)/ Holistic Evaluation Levelling on Performance (HELP) process to establish the summary of facilities for the creation of the new model of built environment. The tabulated parameters finalized the critical issues of regular movement of residents, staff and delivery of food between floors; likely congestion, confusion and accident around elevator and stair during breakfast, lunch and dinner and group activities including safety and security.

Ministry of Health /Institute of Mental Health (MOH/IMH) and the group commenced by re-thinking on the hierarchy of the residents-first as a person, second as a patient and lastly as a “prisoner”-protected resident. This helped to challenge the existing paradigms: the fixed medication timing adjusted to shift schedule and timings too closed, the fixed bathing hours whereby everyone are to be awaken at 5am, the fixed waking, the choice when meals ought to be taken, mandatory bathing before breakfast and the fixed bathing timings. The deliberations on these matter and the eventual decisions have significant impact on the design.

The team acknowledged and accepted that these have significant impact on the proposed psychiatric nursing home built to house. They challenged issues of fixed medication timing, fixed bathing hours, on shift schedule; fixed waking at 5am, choice and when meals are to be taken, mandatory bathing before breakfast which are mostly existing paradigms based on past practices and standards.

At the end of the workshop, one of the items in the design brief that had been amended was the distribution of resident’s mix. With the new distribution of resident’s mix, the activity area is
brought nearer to all the patients. Also, spaces on the ground floor will be better utilized for the group of dementia patients. Other critical item that were discussed was to keep the patients within a cluster of 4 to 6 beds in order to promote better supervision and to create a more homely setting with a smaller group.

The change to the new distribution of resident’s mix lead to the activity areas having spaces and rooms nearer to all the residents and affording the group of dementia-residents to occupy the ground floor. (Figure 4-12)

![Resident’s Mix and the Ramp](image)

**Figure 4-12 Resident’s Mix and the Ramp**

**Note:** In the initial distribution, Dining Hall and Physio were located at the Ground Floor. After 2P they were moved to 4th Floor and the ramp was included to connect them with wards at all levels.

From the findings of the 4 Teams, the Team of Professionals after rigorous and long discussions, arguments and debates obtained the confirmation from the Ministry of Health/ Institute of Mental Health and the full support and endorsement of all members of the User participation Group on the inclusion of the one most important design and significant item of work, the ramp.

The ramp was advocated to the user- participation as the principal means of movement: an effective, safe mode of movement and circulation during peak and non-peak hour for daily use,
as a space for residents’ daily exercise and “night-walk”, as a link for patients to the main dining facilities, the healing environment area, to the healing gardens and to the other areas in the psychiatric nursing home and for residents, staff and visitors to transit easily, conveniently and comfortably in preference to the use of staircase and when lifts are not in operation.

They also accepted the need and beauty of the healing garden and the contribution of the healing environment and art to the psychiatric nursing home. The central garden is the focal point of the proposed design. Coupled with the periphery greenery a seamless green belt is being created to harmonize the building with the greenery.

Other critical item that were discussed was to keep the patients within a cluster of 4 to 6 beds in order to promote better supervision and to create a more homely setting with a smaller group. The adoption of the various facilities could not have been achieved without the support (consistent with the findings arrived from the Japanese examples- Chapter 2) and the understanding and acceptance by the user participation group of the consultants’ explanation that residents of the healing gardens do experience positive change of mood and spiritual experience - prayers (of happenings through, “AHA” experience, Kato) - activate the brains and give new values and hopes. Moving from place, position and posture gives stimulation to all five senses enhance well-being and feeling. Movement (in healing environment of art and garden) exercises and stimulates physical, mental and sensory awareness.

The Contribution by user-participation group resulted in the provision of the required needed facilities in the Design Brief. The initial expectations of the initial brief had been surpassed with the inclusion of many improvements.

Following the 2-day workshop, the design team updated the design, capturing the comments of the workshop.
Figure 4-13 Preliminary Concept Design 2

Note: After captured the comments from 2P, the Preliminary Concept Design 2 was developed
4.3.5 Towards the Ideal Facilities

IMH reviewed Concept Design 3 and gave the following comments:

1. Two dorms (each with 30 beds) per floor. The building will be 7 storeys, if required, to accommodate the requirement.
2. Remove the feature circular ramp. Provide an 'internalised, functional and non-GFA ramp' for the daily movement of the ambulant residents to the common facilities (e.g. dining hall and MPH).
3. One standard dorm layout for all categories of residents, with adequate space for basic bedside activities. Circulation space should be wide enough to facilitate moving of beds and maneuvering of wheelchairs.
4. Agreed to architect’s proposal of ’4 beds in a cluster with low partitions' as shown in the recent concept designs.
5. Toilet and bathroom (wet, dirty, smells, noisy, etc.) for dorm to be away from entrance and nurse station. Good to be located at the end of dorm. Could be shared with day space.
6. Nurse station need not be at entrance. Good to locate near to residents activities and sleeping areas for ease of monitoring.
7. Staff quarters should not be located at the same floor as the dorms and there should not be more than 60 beds per floor.

The architect came up with 2 schemes following that. Option 1 (Figure 4-14), as per the schedule of accommodations (SOA) requirement to have the building built to 7 storeys with 2 wards per level and Option 2 (Figure 4-15) - 4 storeys. This scheme was included because the site actually allowed to have the building built up to only 4 storeys. This would mean a saving in construction cost and the building mass will not be too dominating to the "skyline" of that area. This was done by having 2 pairs of 60-bedded wards at every level, hence achieving the lower storey height. For both options, the following issues were addressed:

1. Toilets - relocated further to the rear of the ward.
2. Lighting and ventilation - the building orientation and fenestrations has been given adjustment to meet ideal lighting and ventilation.
3. Building frontage - For option 1 that has been addressed by having a 3-storey block in front. For option 2, the whole building is 4 storey so that has brought down the impact.
4. Schedule of accommodations (SOA) - both options have got their SOA tabulated with ramps included. Option 2 meets the GFA requirement while Option 1 exceeds by a bit.

5. Main entrance - There's only one entrance to the development in both options.
The 7-story scheme was confirmed and the design team produced the Preliminary Concept Design 4, based on the following comments:

1. Level 1: to have enough turning radius for passenger and service vehicle
2. Level 1: Geriatric room to be re-located to courtyard (combine with sensory room)
3. Common Level: to enclose isolation/treatment/time-out room within “private” area
4. Common Level(ward toilet): to separate bath/toilet
5. Common Level(staff toilet): to segregate male/female cubicle
6. Level 4 (activity level): to re-locate geriatric room to 1st level
7. Level 4 (activity level): to re-locate laundry/linen room to this level

Subsequently, the Consultants were informed to re-look and revise the design of the typical ward so that it is not conventional. A cluster of 6 beds pre units was preferred. Furthermore, to re-look into the whole design concept (both interior and exterior) such that it will be “ground-breaking” as compared to conventional types. The design team responded with Preliminary Concept Design 5. This solution was deemed the appropriate solution arising from that last instruction, creating an iconic and not conventional nursing home. This scheme would eventually lead to the final design. In the view of the latest instruction, the design sign-off was moved to 4 November.
4.3.6 Final Design

All in all, the final design of the new nursing home demonstrated 3 major design emphasis:

1. Good zoning – vertically and horizontally,
2. Efficient planning of different functional spaces and
3. Good maintenance.

A clear zoning of the different functional spaces is critical as the nursing home is serving a special group of users. These user spaces had to be segregated from the public realm and yet, fully inter-linked within itself and made possible with the incorporation of an access ramp located at the east side of the building. The service core is independently located and is also accessible to all levels with the use of the service lift that provides the vertical transportation.

Finally, it was fortuitous that the site was enlarged to accommodate the ramp through the intense effort of the lead consultant with the support of the user-participants. Thus it illustrates that good architecture, engineering design and collaborative efforts of all participants can make great differences to people’s lives.

The Vision (Table 4-2), guidelines and standards (A Guidebook on Nursing Homes and Enhanced Nursing Home Standards) are maintained as follow: -
• 6 m² per bed is adopted in the ward;
• Day-room of each ward of 60 m²;
• Resident’s privacy and dignity;
• Facilities to keep residents meaningfully engaged;
• Environment – safety and comfort; adequate lighting, ventilation, no noise pollution for residents to move around;
• Safety arrangements are in place to protect staff and visitors;
• Facilities of healing environments including healing garden and recreational facilities are included.
• Essential ancillary services whereby residents can be moved and/or transported.

The design have achieved for the following good attributes:-

• Operational:
  1. Patient-centric perspective (Flow and Safety)
  2. Staff-centric perspective (Efficiency)
  3. Safe and disabled friendly
  4. Low maintenance
  5. Homely
• Spatial design:
  1. Facilitates efficient workflow
  2. Allow easy supervision of patients
  3. Promote good airflow (natural ventilation)
  4. Ample activities areas
  5. Safety features

The 7 storied structure with a 6-storey ramp has a simple floor layout with proper placement of living, dining, physiotherapy and occupational therapy rooms which does not exceed residents’ ability to adapt, supports patients’ daily living and wayfinding. (Bush, J. A., et al., 2008). It has purposefully designed space where patients can occasionally get away and be alone thus provide some respite from harmful effects of crowding. (Evans, G. W., 2003) The main features of the planning are 1) the provision of 6 storey high ramp, 2) the positioning of the dining room in the mid-floor, 3) the provision of healing garden, and 4) the use of six bedded rooms.

All these can be used as guidelines so to gain better result in a better built environment that corresponds to the changed life style and the needs of its different users.
CHAPTER 4

CASE STUDY OF THE NEW 300-BEDDED 7-STOREY HIGH-RISE PSYCHIATRIC NURSING HOME, SINGAPORE

1. Clear zoning:
   - Service zone
   - Public zone
   - Private zone
2. Good visual impact

1. Good relation of different spaces
2. Adequate functional space

Figure 4-18 Adopted Design, part 1/2
CHAPTER 4

CASE STUDY OF THE NEW 300-BEDDED 7-STOREY HIGH-RISE PSYCHIATRIC NURSING HOME, SINGAPORE

Mie University, Graduate School of Engineering

Figure 4-19 Adopted Design, part 2/2
The central design issues were to design and to locate the wards, the dining hall and the healing garden; and the ideal mean of movement and the route for the 300 residents, and the caregivers from each level to or from the wards, dining area, to the healing garden and other daily’s activities center. The adoption of the floor plan of the 6 beds cluster (Figure 4-20), and to keep the patients within a cluster of 6 beds in order to promote better supervision and to create a more homely setting with a smaller group.

The 6-Bed Room ward provides the possibility for the cluster to be reconfigured to 2 to 5 beds configurations when desired. Also the expected improvement of living standards in Singapore and the study in Japan shows concerted movement to convert from present 6-bed rooms to 4 - bed rooms so as to give larger space and individual corner for improvement of resident’s privacy and comfort.

Note: Flexible layout so as to give larger space and individual corner for improvement of resident’s privacy and comfort.
The dinning and MPH’s location on level 4 gave equitable travelling distance for ambulant resident (Figure 4-12) to the two top and two bottom floors of 120 residents for their daily 4 meals. Meal to 60 dementia residents on level1 served by lift and ramp from the kitchen at level 4. The relocation of residents’ and dining facility were decided when all agreed with the adoption of the ramp from level 1 to level 6.
With the new distribution of resident’s mix, the activity area is brought nearer to all the patients. The Ministry of Health and The Institute of Mental Health proceeded to accept the six story ramp as the important key common space for residents living in high rise built environment.

The healing garden gave residents the chance to experience positive change of mood and spiritual experience-prayers of happenings through ‘AHA!’ Experience - the Term was acknowledged and made popular by Dr. Kenichiro MOGI, a Japanese brain scientist. This activates their brains to new values and hope while moving from place, position and posture, stimulating and enhances all their five senses of well-being and feeling. The provision of healing environment of art adds to the enjoyment. Supportive design with creative ideas is a critical contributor to a well-planned and designed built-environment. The healing garden in the atrium (Figure 4-24) designed as a relatively small with homelike facilities for residents with mild and moderate form of dementia and stabled psychiatric residents function at a higher level in such setting.

**Figure 4-24 Healing Garden**

*Note: The healing garden in the atrium (designed as homelike facilities for residents*

The ramp on the west side of the complex served as a protected avenue to view the outside world thus providing positive effects to the healing process. The handicap-friendly ramp served the 4 times daily movement of ambulant residents and care- givers to the dining hall for
breakfast lunch, tea and dinner and twice daily to the physiotherapy and/or occupational therapy room on level 4. It linked all the wards to the healing garden in the central atrium level.

The bowing of the complex provided the nurse a more panoramic view of the wards as well as it reduced the distance to the residents’ beds. 2 sides of 5 clusters/wards of 6 beds each bowed and located on levels 1 to 3 and 5 to 6. The dementia ward on level 1 enabled resident’s direct access to the discreetly enclosed garden where they engaged in physical activities in the outdoor space safely without wandering too far or getting lost.

Figure 4-25 Interior Perspective of Ramp

Figure 4-26 Exterior Perspective of Ramp
4.4 The Value of Ramp

The Architect was cognizance that to meet the specific needs of the residents, the care-providers, caregivers within a 7-storied building, the design had to sought additional Means of Movement beside the use of elevators and staircases. The support of this need is given in Janet R. Carman and Myron A. Grant, 1951–“Research Box 9-2 Helping The Elderly Use Stairs—“researchers have found that they have more accidents per amount of use and suffer injuries of greater severity....but when they must use stairs, they tend to have more accident than younger people”

The integration of ramp and movement with “hyperlink” to movement and meaning with “guided” motivation is a 3 in 1 – “a process of borrowing and attaching to and enlarging out to a joyful, sustained and sustainable outcome ” Page 13 Hyperlink : (Zoe and Joseph, 2011) .

Integrated supportive design approach will give a final solution that combines the needs, the benefits, and the functionalities with a final outcome for the enjoyment, use and view of the most important group - (the residents) - and the others.
The ramp is one of the most important elements of the 300-bedded psychiatric nursing home. It provides the following:

a) Efficiency
b) Exercise
c) Therapy

Figure 4-28 Ramp Benefits

a) Efficiency; usefulness of the ramp, lifts and staircases as efficient transferring of residents

In the Psychiatric Nursing Home there are 3 ways to get on and off between each floor: Lift, Staircase, and Ramp. There are 2 lifts, 2 staircases, and 1 ramp. When the facility was designed, proper using of these ways was considered as below;

<table>
<thead>
<tr>
<th>Ways to get on and off between each floor</th>
<th>Proper use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramp</td>
<td>* transfer for RESIDENTS</td>
</tr>
<tr>
<td>Lift 1 (@lobby)</td>
<td>* transfer for VISITORS (also residents)</td>
</tr>
<tr>
<td>Lift 2 (@northwest corner)</td>
<td>* transfer for staff, article supply; for SERVICE</td>
</tr>
<tr>
<td>Staircases</td>
<td>* use only IN EMERGENCY</td>
</tr>
</tbody>
</table>

Table 4-8 Ways to Get On and Off Between Each Floor

The required time for a resident moving from the Ambulant Ward in 6th floor (the farthest point) to the Dining Hall in 4th floor was calculated as a showcase of the benefit of using the ramp, lift, and staircases when are used properly. 7 options of movement are identified as below;

1. **Use only the Ramp**
   - Assuming only ramp is used for transferring residents to dining hall
   - Lift 1 (@lobby) can be used for visitors
   - Lift 2 can be used for staff, article supply, and the other service
   - Staircases is not used; used only in emergency.

2. **Use only Lift_1 (@lobby)**
   - Assuming only lift 1 at lobby is used for transferring residents to dining hall
   - Ramp is not used at all
   - Lift 1 cannot be used for visitors during meal time.
   - Lift 2 can be used for staff, article supply, and the other service.
   - Staircases is not used; used only in emergency.

3. **Use 2 Lifts**
   - Assuming 2 lifts are used for transferring residents to dining hall
   - Ramp is not used at all.
   - Lift 1 cannot be used for visitors during each meal time.
   - Lift 2 cannot be used for staff, article supply, and the other service during each meal time.
• Staircases is not used; used only in emergency.

4. **Use 2 Lifts and Staircases**
   - Assuming only 2 Lifts and Staircases are used for transferring residents to dining hall
   - Ramp is not used at all.
   - Lift 1 cannot be used for visitors during each meal time.
   - Lift 2 cannot be used for staff, article supply, and the other service during each meal time.

5. **Use ramp and Lift_1**
   - Assuming only 2 Lifts and Staircases are used for transferring residents to dining hall
   - Lift 1 cannot be used for visitors.
   - Lift 2 can be used properly for staff, article supply, and the other service.
   - Staircases is not used; used only in emergency.

6. **Use ramp and 2 Lifts**
   - Assuming only 2 Lifts and Staircases are used for transferring residents to dining hall
   - Lift 1 cannot be used for visitors during each meal time.
   - Lift 2 cannot be used for staff, article supply, and the other service during each meal time.
   - Staircases is not used; used only in emergency.

7. **Use ramp, 2 Lifts, and Staircases**
   - Assuming only 2 Lifts and Staircases are used for transferring residents to dining hall
   - Lift 1 cannot be used for visitors during each meal time.
   - Lift 2 cannot be used for staff, article supply, and the other service during each meal time.

➢ Assumptions for Calculation:
   - Number of residents in each floor: 60 people
   - The wards where residents using Dining Hall: 3rd, 5th, 6th (ambulant ward)
   - Capacity of Dining Hall: more than 180 people
   - Walking Velocity of ambulant resident:
     - flat corridor: 1.24 m/sec$^3$
     - ramp: 1.16 m/sec$^4$
     - staircase: 0.53 m/sec$^5$
   - Velocity of each Lift: 3 m/sec$^6$

---

3 Shimada H.,(2006)’Timed Up & Go Test is a Useful Assessment Tool for Community Health in Elderly People’ Physical Therapy Japan, No. 33, 2006, pp105-111
Figure 4-29 The Flow Line of Residents
• Ramp and Staircase capacity

Research shows that pedestrian always maintains 2m distance from a person in front of him or her. (Kato, 1980). Hence, the appropriate distance between 2 walking residents is estimated as 2 meters. Subsequently, maximum 38 Residents are able to use the ramp simultaneously (per floor) and 5 the staircase.

![Diagram showing ramp and staircase capacity](image)

**Figure 4-30** 5 Residents Can Use the Staircase per Floor at the Same Time

**Figure 4-31** 38 Residents Can Use the Ramp per Floor at the Same Time.

• Capacity of each Lift;

According to Ergonomics, the arm span of an elderly person is about 1,500mm. So it was defined that the distance of each person should be 750mm. That is a distance in which a person cannot touch others when he or she reaches out. Therefore it is the capacity of each lift is:

- Lift 1(@lobby); 12 people
- Lift 2(service); 10 people
Although the above numbers are indicative, it is clear that the ramp is the most efficient way of moving.

**b) Exercise; using ramp is the same as walking**

When residents are using the ramp, they need to walking, more than when using the lifts or staircase. The benefits of physical exercise are well-established, and is known that exercising is one way of therapy, including the patients with mental illness. The walking distance from northern Ward to Dining Hall using each way is calculated as below;

<table>
<thead>
<tr>
<th>Option No.</th>
<th>Way of getting on and off</th>
<th>Walking distance from northern Ward to Dining Hall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ramp</td>
<td>Lift 1</td>
</tr>
<tr>
<td>①</td>
<td>●</td>
<td>-</td>
</tr>
<tr>
<td>②</td>
<td>-</td>
<td>●</td>
</tr>
<tr>
<td>③</td>
<td>-</td>
<td>●</td>
</tr>
<tr>
<td>④</td>
<td>-</td>
<td>●</td>
</tr>
<tr>
<td>⑤</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>⑥</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>⑦</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

**Table 4-9 Required Time for the 7 Options**

Figure 4-32 Capacity of each Lift

---

Mie University, Graduate School of Engineering

三 大学, 大学院工学研究科
According to above figure, the residents using ramp will walk double distance than using lifts, which promotes daily walking exercise for resident’s recovery.

c) Therapy; relation with the healing garden

The healing garden is located on the outer side of the ramp. The residents can have visual interaction with the garden while using the ramp, and can benefit from its therapeutic effects. Conversely, using the lift may have negative effects to the patients with mental illness, due to its closed and confined space. Confining the residents with mental illness into such spaces had better to be avoided. Then it is better using ramp as the way to transfer residents, in the point of recovery.

4.5 Planning and Management

The study of the new 7-storey psychiatric nursing home reviewed and evaluated how changes in the project organization structure coupled with poor project management led to design changes after the tender stage had a downstream effect on the contract administration process and the construction sequence. This entire process eventually affected the time, cost and quality of the project.

Review included analyzing the organization structure of the project team at various stages of the project and investigating the impact of the arrival of the operator and evaluation of extension of time. The results show that time, cost and quality of the building were affected by the ineffective change management and processes.

The period from June to November 2010 saw a series of workshops conducted to refine the initial brief. This included case studies carried out on 9 privately operated nursing homes where the objective was to understand the nursing operations of the home in relation to the spatial layout. In addition, a Process Preparation (2P) which included the consultants, stakeholder and the operators was held over 2 days to explore and refine the initial brief. Another design work shop was conducted to further evaluate the findings to enhance the initial brief.
### Table 4-11 Milestone Dates

<table>
<thead>
<tr>
<th>Stages / Approvals</th>
<th>Description / Controls</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Plan Committee (MPC)</td>
<td>For land use and zoning</td>
<td>Approved : 4 April 11</td>
</tr>
<tr>
<td>Development Control (DC)</td>
<td>Development complies with Master Plan land use zoning, gross plot ratio and building height control</td>
<td>Approved : 28 Oct 2011</td>
</tr>
<tr>
<td>Building Plan (BP)</td>
<td>Building works comply with safety and amenity standards prescribed in the Building Control Act / Regulations.</td>
<td>Approved : May 2013</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONSTRUCTION</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary Occupation Permit (TOP)</td>
<td>Permission to occupy building when completed</td>
<td>Target : 13 July 2013</td>
</tr>
<tr>
<td>Project Handover</td>
<td>Handing over of PNH to MOH/ End user</td>
<td>Target : 2nd September 2013</td>
</tr>
</tbody>
</table>

### Table 4-12 Design Stage

<table>
<thead>
<tr>
<th>Stages</th>
<th>Description</th>
<th>Time line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design stage – concept, schematic, detailed design and tender development</td>
<td>For implementation of design brief and schedule of accommodation. Work group sessions with user and consultants.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Steering Committee Meeting 01 : 04 Jun 2010</td>
<td>June 2010 – November 2011</td>
</tr>
<tr>
<td></td>
<td>o Main Consultant Appointment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Focus Group Discussion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Design Workshop</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o 2P Workshop</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Steering Committee Meeting 02 : 04 Nov 2010</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Concept Design Approved</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Steering Committee Meeting 03 : 21 Jan 2011</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Schematic Design Approved</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Steering Committee Meeting 04 : 13 May 2011</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Detailed Design Approved</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Steering Committee Meeting 05 : 21 Nov 2011</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Tender development to award</td>
<td></td>
</tr>
</tbody>
</table>
In retrospective, with reference to Design Stage (Table 4-12) the 5 months workshops were not totally useful in terms of responding to the needs of the actual operator. It was reflected in the amount of changes that were made during the post tender and construction stages. This was due to the fact that the actual operator was not involved in any of the workshops. It highlighted a very important and valuable lesson that the end-user must be involved early in the design process to avoid abortive cost and time downstream.

The client highlighted the need to keep to the tender period in line with the targeted project completion date (i.e. 3rd Quarter 2013). Notwithstanding, the following amendments were made to meet the target:

- Tender documentation was shortened
- Calling of tender moved forward
- Tender evaluation shortened

At the time of tender, only obtained Planning Permission on the 15th August 2011. Planning Clearance (DC) was obtained following the tender exercise on 9th January 2012. As such several BCA issues were not resolved prior to calling tender. The revision of the layout for service block and ESS due to authority’s requirements was an example:-

1) A 2m clear planting strips is required by National Parks Board of Singapore (NParks) and 4m wide driveway is required by Singapore Power Grid (SPPG) requirement on the North-Western boundary where the Electrical substation (ESS) block is located.

2) At pre tender stage, it was deemed that the required 2m planting strips could have 1m of it being laid with grass pavers such that this will form part of the 4m driveway for the proposed substation. This proposal was sent to NParks on 1 Sept 2011 and tender was called on the 15th September 2011

3) At post tender stage, the design had to be revised to comply with the authorities' requirements. This was achieved by modifying the space within the ESS and service areas. Concurrently, a waiver was submitted to NParks on the 26 Jan 2012 but was rejected. As the construction had begun and the modified design to the Electrical Substation (ESS) block was accepted by the workgroup, the project team decided to proceed with the modified design due to the potential time implications and unlikely approval that would result from seeking an appeal.
CHAPTER 4

CASE STUDY OF THE NEW 300-BEDDED 7-STOREY HIGH-RISE PSYCHIATRIC NURSING HOME, SINGAPORE

<table>
<thead>
<tr>
<th>Stages</th>
<th>Description</th>
<th>Time line</th>
</tr>
</thead>
</table>
| Tender stage    | • The Tender was called/closed on 15 Sep 11/20 Oct 11. A total of 31 contractors came for the site show around, out of which 17 submitted the tender. A total of 5 contractors were shortlisted for tender interview. The tender prices were between $14.7m to $23.8m.   
• Tender recommendation report by consultants.  
• Tender evaluation presentation to SC on 21st Nov 2011.  
• TEC evaluation process occurred during the month of December 2011 – January 2012.  
• Award of tender to Kian Hiap on the 13th February 2012. (Expected award of tender mid Dec 2011)  
• Letter of Acceptance by Kian Hiap on the 14th February 2012.  
• Site possession by Kian Hiap on the 22nd February 2012  
• Kick off site meeting on the 27th February 2012. | September 2011-February 2012 |

Table 4-13 Tender Stage

The above example was one of the examples where in depth justification an explanation to be given to the client as any changes at the post tender stage translated to time and cost implications. This could have minimized the downstream process by identifying and highlighting strongly the potential grey areas during the tender preparation and emphasized to the client the time and cost implications of not resolving the issues before calling tender would avoid questions being raised at the post tender stage.

It had been a valuable lesson and would also have saved the need to raise so many request advice on variations (RAOV) plus the countless disputes occurring during the post tender stage. In general, the contractor was able to follow the master program and there was no delay to the construction progress until June 2012. There was a 1% delay from the planned works to the actual works on site due to the retaining wall works and the discovery of the services.

The delay for works increased from 1% to 6% from June 2012 to June 2013. The activities included the new IT server works, changes to doors and windows, changes to minor sewer works and general rescheduling works due to post tender changes. The RI inspection which was originally scheduled on 16th June 2013 will be rescheduled to the end of June. The Temporary Occupation Permit (TOP) ready date remains at the 13th July and the contract completion date after extension of time (EOT) due to 12 wet days stands at the 2nd September 2013.
The contractor on the 10th April 2012 issued a notice of variation change to the retaining wall design and requested a superintended officer’s instruction (SOI) to proceed with the changes. The additional retaining wall was designed to retain the soil from the neighboring site as the boundary wall’s foundation was found higher than the proposed site level based on actual investigation.

A generalized and conservative design for the retaining wall was adopted during the tender as it was a lump sum contract which was not economically advantageous. However, this situation could have been slightly mitigated if there was better coordination between the architect and the structural engineer to take into account the neighbor’s site level.

The design changes to the wall signified a cost implication resulting from an increase in concrete and rebar as well as additional backfilling and hard core to be removed from site since more types of retaining walls were required as compared to the tender. As per the

<table>
<thead>
<tr>
<th>Stages</th>
<th>Description</th>
<th>Time line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction stage</td>
<td>Summary of site works as follows as per master programme dated 30th March 2012 (Appendix D):</td>
<td>February 2012- September 2013</td>
</tr>
<tr>
<td>Preliminaries</td>
<td>• 94 days to be spent on preliminaries including the setting up of site office, site clearance and tree felling, site levelling, hoarding, site setting out, underground cable detection, earth erosion control and demolition of existing road and drains.</td>
<td></td>
</tr>
<tr>
<td>Piling</td>
<td>• Piling was to start on 5th of March 2012 with the 90 piles completed in 6th June 2012. This meant an average of 2 -3 piles per day.</td>
<td></td>
</tr>
<tr>
<td>Substructure and superstructure</td>
<td>• A total of 222 days were to be spent on substructure and superstructure starting with the sequence of pile cap/RC stump, beam and slab/lift pit on 1st floor followed by column, wall, beam, slab and ledge for 2nd-Roof at the 2 storey service block including electrical substation. These works would take about 2/1/2 months to complete. Works will then begin for the north block and then south block starting a month later. The cast cycle was to alternate between the north and south block.</td>
<td></td>
</tr>
</tbody>
</table>

*Table 4-14 Construction Stage*

**Extension of Time - Changes to retaining wall - Discovery of additional existing underground services**

The contractor on the 10th April 2012 issued a notice of variation change to the retaining wall design and requested a superintended officer’s instruction (SOI) to proceed with the changes. The additional retaining wall was designed to retain the soil from the neighboring site as the boundary wall’s foundation was found higher than the proposed site level based on actual investigation.

A generalized and conservative design for the retaining wall was adopted during the tender as it was a lump sum contract which was not economically advantageous. However, this situation could have been slightly mitigated if there was better coordination between the architect and the structural engineer to take into account the neighbor’s site level.

The design changes to the wall signified a cost implication resulting from an increase in concrete and rebar as well as additional backfilling and hard core to be removed from site since more types of retaining walls were required as compared to the tender. As per the
contract documents, the schedule of rates for the building works were prepared in accordance with the standard method of measurement of building works.

A week later, the contractor submitted a notice of variation on the 17th April 2012 for additional existing underground services found within the contract boundary. The discovery of the services subsequently had an adverse effect start date of the construction of the new retaining walls as the nature of the services had to be identified and diverted. A lengthy amount of time was spent on the tracing of the pipes and ascertaining what to be done with the pipes and cables. The cable detection survey could have covered a larger area which could be provided to the contractors at the tender stage. More time could have been factored into the construction program for the contractor to perform more bore holes during the underground detection stage.

This process in addition to the convoluted administrative procedures eventually affected the extension of time claim by the contractor. Extension of time (EOT) registered claims in general, it’s important to note that the contractor’s claim was based whether the activity are in the critical path and how it affected the master program and/or milestones such as Registered Inspector (RI) inspection date and temporary occupation permit (TOP) ready date. In this case, both structural engineer and the M&E engineer found the submission of EOT inadmissible as they opined that the delay was primarily caused by the contractor themselves and it did not affect the critical path.

It needed to be noted that many EOT claims that were subsequently raised were also considered inadmissible even though works could not be completed by the RI inspection date and TOP ready date as the works could be completed by the contractual completion date.

While the group moderated views, exchanged and contributed ideas, the team of consultants used the finalized data to progressively continued to develop with regards to the design brief, the constraints and opportunities of the site, the allowable gross floor area, the cost, time and budget including the mix and the level of the residents on the respective floors.

4.5.1 Observation and Evaluation

Integrating the professional team in partnerships with caregivers and key participating group benefitted from practice and design research – a dictum of shifting practice – and created the new model of the 300-bedded 7-Storey Psychiatric Nursing Home. It achieved several value added elements as well as threw out numerous challenges. In the process, it demonstrated the
need to establish a consistent project team to ensure the elimination of direct and indirect negative decisions having impact to the management and construction of the project.

Design research coupled with sound project management, organization and effective control during the implementation and construction stage ensured an outcome devoid of unnecessary cost overrun and delay.

The evaluation and analysis of the project were based on four observations: a) on structure b) the aggravation by poor management, c) the impact of amendments after tender, and d) the effects of contract administration process / the change of organization sequence.

It showed the initial brief coupled with poor management together with changes in the project organization structure led to changes in design after the tender stage. It had a downstream effect on the contract administration process and the construction sequence. This entire process eventually affected the time, cost and quality of the project.

**Tender Stage**

![Tender Stage Organization Chart for New Psychiatric Nursing Home](image)

<table>
<thead>
<tr>
<th>Project member</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Health (MOH)</td>
<td>Developer for the project</td>
</tr>
<tr>
<td>Steering Committee (SC)</td>
<td>Driver of the project</td>
</tr>
<tr>
<td>Institute of Mental Health (IMH)</td>
<td>Commissioning secretariat, implements the project, interface between workgroup and project manager</td>
</tr>
<tr>
<td>PM Link (PML)</td>
<td>Project manager, provided guidelines on how the project could be run for example procurement, tender period, interface between consultants and client</td>
</tr>
<tr>
<td>Main Consultants (DEG, MHCS, MHME, LS)</td>
<td>Architect, Structural Engineer, Mechanical and Electrical Engineer, Quantity surveyor</td>
</tr>
</tbody>
</table>

*Figure 4.33 Tender Stage Organization Chart for New Psychiatric Nursing Home*
4.5.2 Change of Organization Structure of Project Team at Tender and Post Tender Stage

At the design stage/pre tender stage, the initial brief guideline and schedule of accommodation were provided by project manager. The Steering Committee spearheaded the design process with inputs from the Work Group who were representing the interest of the end users of the building.

At post-tender stage, there were many amendments to the design brief with further design inputs from the Work Group and also changes requested from the operator. The impact of the design refinements and changes was evident for the consultants. The whole process of coordination between consultants, subsequent consultation with different authorities and costing exercises had to take place before any decision and approval to proceed could be given by the client body.

![Post Tender Stage Organization Chart at for New Psychiatric Nursing Home](image)

**Figure 4-34 Post Tender Stage Organization Chart at for New Psychiatric Nursing Home**

It must be bore in mind that at this stage, construction works had already begun according to the master program. These changes subsequently impacted the contractor’s works in terms of
sequencing of works, variation order and extension of time (EOT). Overall, the need for refinement and additional changes highlighted the ineffectiveness of the initial design brief. The work group’s role to provide design criteria as an initial end-user failed to ultimately meet the real needs of the operator of the building. A concise and better brief could have been established before the start of the project by marrying initial end users’ requirements with actual end users’ needs at a longer briefing session. This could help to limit the amount of design changes down the line. This of course meant that an operator must be identified at the briefing stage, which in many instances might not be feasible. In that case, they should have been brought in at the schematic stage and detailed design stage to ensure that their basic operational needs were met.

4.5.3 Change in Project Management Procedure

At the design and pre-tender stages, there was a clear management process with the project manager interfacing with the commissioning Secretariat and the consultants in terms of design decisions, approvals and deadlines.

At tender and post tender stage, the introduction of Ministry of Health (MOH), Ministry of Health Holding (MOHH) and the operator to the existing framework changed the mechanism of the management process. The project manager was still meant to manage and control the process. However, there were just too many figures of authority, which made the process cumbersome, confusing and resulting in delays.

The impact of having a large client body was clearly demonstrated in the time required to obtain decision and approvals for design requests and changes and resolution of Request of Approval of Variation (RAOV) issues. Construction was still on-going according to the master program during the change and decision making process. This slow and tedious change process caused the contractor to hold back some construction works and subsequently made the contractor issue notice of extension of time for the changes.

Some confusion also arose due to the instructions given by different parties in the client body. In the strict sense, all information and instruction from the client body was meant to be passed to the project manager before being given to the consultants. However, there were many times that the clients corresponded directly with the consultant team, as it was more efficient in terms of time especially given such a tight schedule.

The question of the role of the project manager surfaced as the project progressed. The architect
took on a large of responsibility from the project manager who had difficulties coordinating different users’ requirements. Fortunately, the architect was fully capable of managing the process. The recommendation for such a project in future is to reduce the number of clients involved thereby reducing the highly complex and tedious coordination process.

The delays experienced downstream were also due to the bureaucratic method of obtaining approvals to proceed before instructions could be given to the contractor to proceed. The discrepancies in the initial brief of the building were compounded by the late arrival of the actual operator’s brief. They created more issues. The several issues that arose downstream could have been mitigated if exact brief was set up at the start of the project, adequate time was allocated for the project tender and development stage, and right project team was assembled at the start of the project and had creative process for effective change management.

However, several factors had ensured the successful completion of the project with having effective teamwork and communication between consultants and contractor, Architect’s willingness and quick responsiveness to accommodate the clients’ requests and Contractor’s willingness to accommodate the consultants’ and clients’ requests. Shifting Practice demonstrated the importance and the need to establish a consistent Project team from the start, to cater and provide adequate time for initial briefings to clients and Consultants and to finalize all planning and building approvals prior to tender to avoid last minute changes.

4.5.4 Facility Management

Facility Management is an integral and longest phase of assessing building performance. The monitoring regime is an ongoing performance which yields an operating resource, an important business expense. (Preiser and Vischer, 2005)

The case study demonstrates how the design process can lead to successful (or not) and efficient Facility Management (FM). It also demonstrates the importance of process continuity, from the start to the facility management stage. Many of the issues, usually identified during the process, can be avoided by planning from the beginning with facility management in mind; that is by involving the operator’s facility manager on his choice and system from early stages.

Further, during the survey of the nine existing nursing homes the Team noted a consistent and strong viewpoint from management on its support that early and detailed discussion needed to be made on facility management. It deems as a natural sequence to the next stage of building performance evaluation and as post-occupancy evaluation for future use.
Many definitions of facilities management exist and it is difficult to generate a widely accepted definition. International Facility Management Association (IFMA) defines FM as “a profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, places, processes and technology”. This definition clearly shows the holistic nature of the FM discipline, indicating interdependence of various factors in successful FM. (Zhu R., 2013)

Hence, a holistic approach with the inclusion of the design stage in this process is required. Specifically for healthcare facilities and nursing homes, this process will raise the effectiveness of healthcare service delivery.

Baldwin and Shaw (2005) stated that when it comes to patients’ choice of healthcare facility, technical health-related issues may affect the facility’s reputation, but patients tend to base their choice on subjective assessments of patient-encountered FM services, such as the hospital environment, facilities for visitors and perceived cleanliness. This clearly illustrates the importance of the design in FM.

Power fundamentally lies in the hands of the clients and operators and can never be derived from any delivery process however well defined. The architectural profession's principal responsibility is to articulate clients' requirements and communicate them to the industry so that they can be met in the most elegant way for the longest term. (Duffy F., 2012)

In the case of the new Nursing Home, various discussion and workshops were held to gain knowledge so as to formulate an ideal facility with the best workflow, to learn avoid ‘negative’ pitfalls, and to elicit their feedback on the challenges faced (in operating their facilities) on the following:-

• Innovation – Out of the box idea, that challenge the norm. Dwelling on a patient orientated environment, giving them a home like, healthy and comfortable environment.

• Staff and patient workflow, - Relations of spaces and how groups of facilities are group amongst themselves to minimise travelling time, swift and quick movement, point to point for staff to staff, staff to patient, etc. Sharing of facility / activities spaces.

Work flow also includes how daily food delivery to patient back and forth, removal of waste, clean and dirty flow within sensitive environment, sterilisation room, treatment rooms, kitchen, food preparation areas, etc.
• Safety and Security – surveillance by nursing manager and supervising personal. Patient privacy, and addressing patient needs for security based on their profile / special need. Dementia patient, require protection, from running away, safety grille. Allowing patient to wander and enjoying nature, however within a protected environment. Forms of identification, using familiar images, where patient can easily identify and giving them sense of direction.

• Design for flexibility and allow future expansions. Spaces which are highly flexible and allow for dual usage. Living areas combined with living spaces that allow interaction of patient and staff.

• To identify contingency plan/ spaces during Haze period\(^7\), i.e. some of the wards spaces are capable to be fully enclosed with air – conditioning during this period of haze outbreak. To be able to still function the building during Haze period, where patient had to be kept indoor and not able to enjoy the outdoor environment.

• Ease of Maintenance to the designed mechanical system and equipment. Adequate access opening. Equipment specification, flexibility and ease of replacement, monitoring.

4.6 Conclusion

The Consultants were cognizance of the aims, objectives of the Ministry of Health and the Institute of Mental Health and appreciated their institution of an Action Plan that closely represented the integrative framework for building performance evaluation. (Preiser and Schramm, 1997) with the essentials of: (1) strategic planning, (2) programming, (3) design, (4) construction, (5) occupancy, (6) adaptive reuse / recycling. (Wolfgang, Preiser and Jacqueline, 2005)

The Ministry of Health had carried “a strategic plan based on the medium and long term needs of an organization as determined by a market / needs analysis, based on the organization’s mission and goals as well as facility audits (Preiser and Schramm, 1997

On completion of the review on the strategic planning, on Ministry of Health/Institute of Mental Health’s mission and goals including facility audits, on the programming/briefing-

---

\(^7\) Singapore has been affected by severe smoke haze due to forest fires in the region periodically.
programme review and the recommendations established from the Case Study, Client’s approval was given to commence with the Planning and Design.

The Lead Consultant and the Design Team, Project Manager and the Ministry of Health/Institute of Mental Health’s Focus Group and Users-Participation Group began in earnest with the generated ideas – ‘to ensure good design outcome, to satisfies clients and users’ requirements, to resolve technical and cost/financial issues/problems and to have built-in cost-saving capability’.

Also the Team was tasked to collate all the significant, key and relevant pieces of information which are often not timely raised by users, caregivers and care-providers and/ or often accorded low/weaker priority and to set up a structured organization with controlled process for the project. These oversights have serious and impacting consequences on the built-environment.

The Recommendations, together with the findings obtained earlier from the overall study of related facilities and study of related facilities and details, were again meticulously studied, challenged and tested on their relevance, suitability and value by the Focus Group, the Users-Participation Group together with the Team of Professional Consultants (under the moderation of the Lead Consultant and the Project Manager) before their adoption into the proposal.

The main outcomes of the new 300 bedded 7-storey psychiatric nursing home are; 1) the inclusion of the 6-storey high ramp, 2) the positioning of the dining room in the mid-floor, 3) the provision of healing garden, and 4) the use of six bedded rooms.

The continuous 6-storey ramp is the defining design element that provides dementia and psychiatric residents’ personal control between different floors. It helps residents to attain the sense of personal control and balance of the ramp as a wayfinding path. This common space does not stress the residents but helps to reduce their urge to wander or demonstrate exit-seeking behaviors. Caregivers’ daily work achieve greater efficiency, greater work satisfaction as use of the ramp imposes less concentrated and concerted physical effort as compared to the use of stairs.

The dining hall on level 4 with the ramp controls the movements of residents, caregivers and visitors. Its location achieves equitable travelling distance, via the ramp, for the 120 residents on the two top and the two bottom floors.
The Healing Garden in the center courtyard provides residents view to trees, water, and natural landscapes in a secure and safe healing environment. It helps residents to cope better with stress, heightens their body awareness, strengthens their feelings of self-worth, and improves their social competence. Residents in dementia ward on level 1 have direct access to the discreetly enclosed garden for their physical activities.

The 5 levels of wards (300 beds) with 5 rooms of 6 beds a departure from the linear long bed arrangement afford the nurse better vision of the residents. It allows change and flexibility and to deal with severe outbreaks as well as to meet different residents' disabilities and illness. The Study concludes that the synthesizing ability of designers and design researchers to reach common ground across various aspects lead to the important inclusion of:-

a) The Ramp as the principal means of Movement – It became the effective, safe mode of movement and circulation for daily use during peak and non-peak hour. It’s the designated space for residents’ daily exercise and “night/nocturnal” walk and further confirmed the finding ‘A series of common spaces in a variety of areas inside and outside hospital rooms should be created and this should not hamper the privacy of personal space’ (refer- Chapter 2 the study on Japanese’s examples). It linked patients to the main dining facilities, the healing environment area, healing gardens and to other activities’ areas. Residents, staff and visitors used the ramp daily and especially when the lifts were not in operation to exit the psychiatric nursing home.

b) The central location of the healing garden encouraged movement of residents and in the process they experienced positive change of mood and spiritual experience - prayers (of happenings through “AHA” via experience - Kato). Healing garden helped to activate the brains to give new values and hope; and moving from place, position and posture gave stimulation to all the five senses to enhance well-being and good feeling. Also, healing environment of Art and Plants encouraged visual exercise stimulating physical, mental and sensory awareness. Everyday activities held in this secured and safe environment helped residents to cope better with stress, heightens their body awareness, strengthens their feelings of self-worth, and improves their social competence. The dementia ward on level 1 gave residents’ direct access to the discreetly enclosed garden for their physical activities.

c) The dining hall located on level 4 regulates and controls travel and controlled with the ramp the movements of residents, caregivers and visitors. Its location achieved equitable
travelling distance, via the ramp, for the 120 residents on the two top and the two bottom floors.

d) The 5 levels of wards (300 beds) with 5 wards of 6 beds (each) instead of the linear long bed arrangement gave nurse better vision of the residents. The ward allowed change and flexibility for re-configuration to cope with different residents’ disabilities and illness, and to deal with severe outbreaks. The adoption of the design proposal of 6 bedded bay and its acceptance owes much to the research finding regarding the use of larger wards in Singaporean nursing and that regarding the use of single rooms in Japanese contemporary unit care facilities and the process of use of multi-bed rooms and single rooms in Japanese hospitals (refer to the study on Japanese’s examples in Chapter 2).

*Figure 4-35 Completed Psychiatric Nursing Home*
References


Children’s Hospital, Health-care Facility Wayfinding Study, Architectural Institute of Japan 5233


CHAPTER 4

CASE STUDY OF THE NEW 300-BEDDED 7-STOREY HIGH-RISE PSYCHIATRIC NURSING HOME, SINGAPORE


Pioneer Network. Comparison of Nursing Home Cultures: Institution Directed versus Person-directed.


World Health Organization Western Pacific Region, http://www.wpro.who.int/home.h


CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The study aimed to answer the 4 set goals:

A. Better Results in a Better Built Environment
B. Impact / Issues of High Rise Developments
C. Better Solutions through Research, BPE of Existing Facilities and User Participation
D. Addressing Societal Issues and impact of Design as Politics

The study of existing nursing homes in Japan and Singapore, Chapter 2 and 3 respectively, identified key aspects that impact design, planning and management of nursing homes. These lead to adoption of the best attributes for the new 300-Bedded 7-Storey Psychiatric Nursing Home (Chapter 4), while helped avoiding identified issues and pitfalls.

5.1.1 Better Results in a Better Built Environment

The main aspects that are identified to have impact on planning and design of nursing homes and lead to a better built environment for the residents are:

- Site – Provision of open space for communal usage, orientation of the buildings, creating cool, naturally ventilated interior space are provided and all the wards are not A/C.

- Patient Profile - Non-ambulant patients are located at lower floor for the ease of trolley bed maneuvering. Common space- activity rooms and MPH -are located in the middle floors making them more accessible to the patients. Intellectually disabled patient are housed at the highest floor for better segregation.

- Nursing observation versus patient privacy. A fan-shaped plan is better compared to the traditional straight line plan for the ease of supervision of the nurse. The 5 ward is bowed to improve the supervision spectrum. The ward also allows change and flexibility in configuration to cope with different residents’ disabilities and illness.

- Healing Garden is a secured and safe environment that offers everyday activities in a soothing yet challenging experience. It is an important pathway through which the built
environment can influence mental health with its restorative power (Evans, 2003) as it helps patients with mild and moderate forms of dementia to function at a higher level of their own endeavor. (Cooper et al., 2014)

- Safety on the use of the ramp, in the garden and others areas. All the floors in the outdoor spaces have to be barrier-free and slip resistant for all the patients.

- Continuous ramp is a defining design element that helps dementia and psychiatric patients to attain the sense of personal control and balance from an otherwise helpless and frustrated situation with regards to mobility between different floors. Caregivers’ daily work achieve greater efficiency and greater work satisfaction as the use of the ramp imposes less concentrated and concerted physical effort as compared to the use of stairs. The ramp is the visual connector to Ulrich’s seminal thesis (1984) ‘view through a window influence recovery’, an emergency exit to the external compound and allows the residents to do their nocturnal walk in a safe and protected space.

Ramp when linked with meaning and motivation progresses improves the final outcome and enlarges the experience and the understanding of the world. The ramp generates the awareness and it confirms the context of the space and location. It helps to attest William’s Affordable Excellence and Lim’s Myth or Magic respectively assertions to the need to search for further improvement of healthcare and its services. Jeremy reveals the magic and exposes the myth, while William gives credits to Singapore for achieving and maintaining the good health of the populace at reasonable cost. He also alludes that this is

![Figure 5-1 Ward Layout Consisting of 6 Beds per Cluster](image)
an attainable dream for many nations. It also provides a better understanding to management how built-environment is impacted by ‘design as politics’.

5.1.2 Impact / Issues of High Rise Developments
Designers are required to provide suitable design elements in the high-rise build environment to support the well-being of residents and the work of the caregivers.

- Common spaces like the dining hall are the main circulation route and they have to be accessible from all the wards at each level. Thus locating these spaces on the middle levels and with the provision of “friendly way-finding” ramp, regulates and controls traveling of residents, caregivers and visitors. This location achieves equitable travelling distance for the residents on the top and the bottom floors.

![Figure 5-2 Section - Dining Hall Located on the Middle Floor](image)

- The Healing Garden located in a central courtyard provides residents with exposure to natural elements and helps them to cope better with the psychological effects of living in high-rise built environment. Placing the dementia ward the same level enables residents’ direct access to the discreetly enclosed garden for their physical activities.
• Ramp serves as a link between all the floors, for maneuvering of large numbers of patients during peak hours. It augment the fire escape staircase. It helps in the daily movement (when required) of trolley beds and in times of emergencies. The ramp is essential to achieve universal and sustainable ways of living, working and producing in a high-rise environment.

Figure 5-3 Healing Garden

Figure 5-4 External View of 6-Storey Ramp
5.1.3 Better Solutions through Research, Building Performance Evaluation of Existing Facilities and User Participation

The new Psychiatric Nursing Home was one of the five nursing homes set up under the national program for subsidized nursing home facilities for stabilized psychiatric patients. All in all, the government has been aggressively expanding the nursing home numbers and beds, and has been building 10 new nursing homes and complementary day care, dementia day care, day rehabilitation services. (APPENDIX D lists the government-built nursing homes completed between 2013 and 2016). They were to be fully completed by end 2016 and early 2017. They are located in areas to involve the community in eldercare as well as to create elderly-friendly neighborhoods.

All these show Singapore’s recent achievement in public nursing homes and that its approach is sound when it is planned and implemented with focus on collaborative efforts of all key players and participants to resolve real issues.

Integration of researches and studies on human behavior and well-beings into the designing and planning of new healthcare facilities results in a safer and better living environment, especially for dementia and other psychiatric patients. It helps to eliminate direct and indirect impacts on psychical and psychological well-being and psychological distress. It endows a built environment with creative environment to allow caregivers and care-providers to work effectively and efficiently helping patients’ recovery.

End-users, caregivers and care-providers are the players and the participants that provide the issues, the intimate feedback and knowledge of the needs, wants and expectations and the host of problems related to the built-environment.

The study demonstrates, while Singapore’s model for built-environment is able to meet the increasing and evolving needs, wants and expectations and benefit the principal beneficiaries - residents, caregivers and care-providers, it is a ‘ongoing work’ model in action. It is recommended that further study be made on key areas of possible failures as well as on key areas of creative opportunities. These studies will help to eliminate negative results and will gain good results for a better built-environment.

The study of the 300-bedded psychiatric nursing home offered valuable lessons for designing, planning and managing public nursing homes in Singapore. The discrepancies in the initial brief of the building were compounded by the late arrival of the actual operator’s brief. They
created more issues. The delays experienced downstream were also due to the bureaucratic method of obtaining approvals to proceed before instructions could be given to the contractor to proceed.

Moreover, the several issues that arose downstream could have been mitigated if exact brief was set up at the start of the project, adequate time was allocated for the project tender and development stage, right project team was assembled at the start of the project and had creative process for proper change management.

These issues can be resolved with proper planning from the initial stages of a project. The planning, design and management of the 15 million dollar project as well as managing the complexity of the project, the changes of the brief after the tender stage, the organization and the management of the delivery of the project were satisfactorily achieved. This underlines the importance and the need to establish a consistent Project team from the start, to cater and provide adequate time for initial briefings to clients and Consultants and to finalize all planning and building approvals prior to tender to avoid last minute changes. Moreover, the study showed that having effective team work and communication between consultants and contractor can ensure the successful completion.

The design of health facilities in general has long focused on the functional necessities of the process of delivering health care only. The opportunity now exists - to formulate new action, to meet new circumstances and new demands, to derive new insight to obtain fresh resources of qualitative and quantitative intelligences from all stakeholders and key participants.

This study showcased the importance of process continuity to the Facility Management stage, which should lead to the next stage of building performance evaluation and post-occupancy evaluation.

Adopting HELP, the process of evidence based approach and design and its inherent rigorous approach – to seeks, institutes, and investigates - informs the project’s goals and its guidelines. The qualitative and quantitative information gathered provide the Consultants team with the added know how -to learn, to appreciate and to analyze - the essential needs of the existing cultures of the organization and its strategic objectives and affords the flaws to be discovered, reviewed and be rejected before an appropriate solution/ process is decided upon. Such process will lead to a new built-environment as well a new model of public nursing home.
5.1.4 Societal Issues, Impact of Design as Politics

Politics is the prime mover on policies in healthcare services in all developed and developing countries. Attitudes of all key participants and players in healthcare are affected by policies which decide and shape healthcare systems, its facilities and its built-environments. A better and clearer understanding in area of governance, participating for better polices in debate and offering constructive alternatives within the context and boundary of the circumstances are needed in democratic countries including Singapore.

Design per se is not usually associated with politics, other than through, image-making, branding and production of promotional materials. Design as politics is an institutionalized practice exercised by individuals, organizations and governments. However, it is profoundly political as design gives material form and directionality to the ideological embodiment of a particular politics while politics are enacted by the political actions of activists, parties, Governments and policies.

In a world of rapid globalization and urbanization, increasing population pressures and growth, and the need of structural sustainability, the relation between design and the political will become more important. Due to rapid global-warming, Design as Politics is also Fry’s thesis (Fry, 2011) that it is design’s role to ensure sustainability in this growing structural unsustainability. In fact the situation has made design overtly and proactively political. History of architecture and design confirms: cities, hospitals, prisons, offices, factories, homes, parks, public transport, utilities, infrastructures, public information and others, all arrive with forms and conditions lodged in particular sets of ideological value, context and time. They should be viewed and be treated accordingly.

It is the hope of the thesis that with deeper understanding of Singapore’s five decades of prioritized, planning, designing and management of its public nursing home would offer a real life scenario for Singaporeans to deliberate on, plan, design and manage better built-environment for its future. It also hopes that it may provide some explanations to the many questions that health policy observers all over the world may seek to know.

Moving forward to SG100, Singapore and Singaporeans must appreciate the complexity in nursing home’s history and the evolution of politics and its policies. As public nursing home is likely and expected to play a central role in the future of healthcare landscape in Singapore, the public needs to have a clear understanding and acceptance that Design as politics and its policies do affect and govern the development of healthcare and its facilities. It has widespread
repercussions on society. An informed understanding of these trade-offs would not just inform policymakers, but also assists families, healthcare professionals and caregivers in making optimal choices for their aging.

5.2 Limitations and Suggestions for Future Research

This study has focused on public nursing homes. It is the author’s belief that the methods used for the study and the conclusions that derive from it can be used in private nursing homes as well. However, additional study is needed so to examine the specific factors that govern these homes, like economic criteria.

In addition, the study aims to be used as guideline for countries with similar demographics like Singapore. Nevertheless, the local context of Singapore, e.g. social factors has been used. Therefore, the respective local context must be taken into consideration when trying to apply the study in other countries.

Considering the limitations of the study, as it focuses on planning and designing issues, one suggestion for future research is to explore further the impact of Politics in design and Shifting Ground. Shifting Ground is changing the tectonics of design research, design delivery and design education. It can lead healthcare built environment towards higher excellence. It offers many opportunities and challenges that need to be addressed.

Last but not least, Facility Management stage and how it will lead to the next stage of Building Performance Evaluation and Post-Occupancy Evaluation is another field that can be further explored by another research.
CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

References


APPENDIX A

OVERVIEW OF HEALTHCARE IN SINGAPORE

Singapore founded by the British in 1819 was then considered merely as a port to serve as a counter-balance to the Dutch and to protect their interests in the Far East. It suited and was accepted by everyone that Western healthcare was largely provided for the small group of European settlers and the British Administrators stationed in Singapore. The medical staff was made up of military personnel, consisting of an assistant surgeon and an assistant apothecary, assisted by a few medical subordinates and nursing performed by convicts. Medical services were strictly segregated along economic and social status. It remained the preserve of European soldiers, Indian soldiers and the colonial government.

The small ethnic communities accepted it as politics and political (Fry, T., 2011) to be excluded and be left alone so that they could go about their business and their work. Therefore, they were left to fend for themselves in healthcare matter by relying on their traditional healers, their own concoction of medicines and their own shelters.

Nevertheless, in the later years Singapore began to become more commercially significant because of its location and its deep sea-port. The increase in commercial activities in turn required a quantum increase of both foreign and western educated ethnic working population to attend to the growing volume of trades. Western Healthcare including medicine was introduced to the general population due to British’s philosophy on its ‘participating and consolidation of political rule’ (Lefort, C., 1988) The expansion of the General Hospital and the ‘poor-man’ Hospital (precursor to Tan Tock Seng Hospital) was an act by the British as socialization and legitimizing colonization to benefit the locals and to maintain the good health of the new added work-force to perform the tasks properly. Medical care in Singapore had undergone change by the 1940s with the introduction of national health schemes that worked in tandem with public health and sanitation measures such as anti-malaria work, sewage and refuse disposal and maintenance of the water supply.

The Beginnings of Nursing: 1800s

A skeletal medical team accompanied Stamford Raffles’s troops, when he arrived in Singapore in January 1819 The all-male group consisted of military doctors, apothecaries (similar to
modern-day pharmacists), orderlies and dressers specializing in wound dressing and bandaging. A wooden shed was erected in 1819 near the junction of Bras Basah Road and Stamford Road to treat as well as house sick soldiers. This rudimentary shed, which was rebuilt in 1821, served as a general hospital staffed by army surgeons and is regarded today as the predecessor of the Singapore General Hospital. Basic “nursing” at the hospital was carried out by unwilling chained convicts as there were no nurses at the time.

Soon after the establishment of a British trading outpost and its development as a port by Raffles, Singapore’s reputation grew and more people arrived to trade and to seek better prospects. They grew an urgent need to provide medical facilities as the available healthcare was very basic. There were no local physicians and the situation was made worse by the lack of qualified medical personnel. Those who served in Singapore were mainly military doctors posted from either Britain or India.

Between the 1820s and 80s, the General Hospital moved locations several times and assumed different names while private hospitals like the Chinese Pauper’s Hospital (which later became Tan Tock Seng Hospital) was constructed to meet the growing demand for healthcare. These “hospitals” offered very basic medical facilities for the sick and were nowhere near the modern definition of hospitals as we know them today.

During this period, the main challenge of the hospitals was to recruit qualified staff – a problem the profession would continue to face in the decades to come. At the makeshift General Hospital in the Bra Basah and Stamford Road area, the fully occupied apothecaries, orderlies and dressers had to cover “nursing” duties in addition to their own work. As the female population increased and hospitals began admitting women, requests for female careers arose. Only after the 1850s, did women go to give birth in a hospital.

In 1856, the post of a female attendant included in the plan for the new General Hospital and Lunatic Asylum in Kandang Kerbau district, was not approved. Only in January 1867, the colonial administration finally approved the request for a female attendant to work in both premises. The heavy workload of Singapore’s very first female “nurse”, having to run between the two premises, and earning a measly monthly wage was a significant event in Singapore’s nursing history. It marked the first time a female employee was employed in the Medical Department.
In 1873, an outbreak of cholera occurred at the Lunatic Asylum at Kandang Kerbau, and patients at the General Hospital next door were evacuated to temporary premises at Sepoy Lines, located in the area around the junction of Outram Road and New Bridge Road. On 1 August 1882, the new General Hospital replaced the old buildings at Sepoy Lines.

Although the inclusion of British trained professional nurses had been suggested, it would be difficult to recruit such nurses to work in Singapore. Subsisting then, “nursing” tasks were performed largely by hospital servants, while the more serious cases were supervised by the general staff, with the assistance of more able patients.

The 1883 Medical Report submitted by Dr. Max F. Simon, Surgeon in Charge of the General Hospital at Sepoy Lines, to Dr. T. Irvine Rowell, his Principal Civil Medical Officer, recommended that the General Hospital employ a Matron and two Nurses.

The government agreed that the General Hospital was in dire need of trained nurses and better nursing facilities. The proposed plan was to train the French nuns from the Convent of the Holy Infant Jesus – viewed as the only educated and qualified European women in Singapore then – who were prepared to undertake this selfless work. The proposal was immediately met with objections by some segments of the public. Despite vehement protests, the government went ahead and appealed to the convent. Thankfully, common sense prevailed and the nuns began their nursing duties at the General Hospital on 1 August 1885. The date officially marks the beginnings of nursing in Singapore.

In 1896, the Colonial Nursing Association was formed in England to meet the nursing needs of the British colonies. In 1899, The Straits Times accepted subscriptions and donations to fund the recruitment of nurses from England which the public donated generously. By May 1900, the French nuns had withdrawn from their nursing duties at the General Hospital, and in the same month, four qualified nurses arrived from England and took over the care of the patients. By the end of 1903, all the four qualified nurses from England had left their posts. They were replaced by other expatriates; the pool of trained nurses remained largely stagnant. Subsequent arrivals succumbed to illnesses such as tuberculosis and malaria as they were unused to working in a tropical country. In 1911, for instance, seven out of 10 Sisters and six out of 13 Nurse Probationers were admitted to hospital.
Later Developments: 1900 – 1940

The minimum entry requirement for nursing school in the early 1900s was the completion of the Junior Cambridge Examination. The very fact that trained nurses had to be recruited from overseas highlighted the dismal state of education among local women in Singapore. Most women in those days were confined to traditional domestic roles – as daughters, wives and mothers – and generally did not receive much education.

The local Malay community had their own birth practices. It was not until 1888 that the first eight-bed maternity hospital was set up at the junction of Victoria Street and Stamford Canal. The hiring of a qualified midwife named Mrs. R. Woldstein that year is the first record of a trained midwife in Singapore.

In 1908, the infant mortality rate was 347.8 per one thousand live births, with almost 60 percent of deaths occurring during the first three months of birth. To give a sense of how far we have come, Singapore’s infant mortality rate in 2015 was 1.7 per one thousand live births.

With rising concerns over the high infant mortality rate, Miss J. E. Blundell from England was appointed as Municipal Nurse for early life conditions of infants. The findings confirmed that poor infant feeding was the main contributor to infant mortality. Miss Blundell was subsequently asked to instruct local mothers on the proper care of their infants and young children. Her findings led to the start of a regular midwifery course for local women in 1910, with proper instruction and licensing of midwives. That year marked the beginning of the Maternal and Child Health Service in Singapore.

World War I broke out in July 1914 and many British nurses including Miss M. J. McNair, then the Head Nurse of the General Hospital at Sepoy Lines volunteered for service in the Armed Forces in England. This was perfectly laudable of course but it put a severe strain on the existing nursing staff in Singapore, and it became extremely difficult to find their replacements.

World War II to Self- Government: 1940s – 1958

During the outbreak of World War II and the fall of Singapore on 15 February 1942, nurses were allowed to leave the hospitals. Those who opted to remain were transferred to the Mental Hospital (the predecessor of Woodbridge Hospital, better known as the Institute of Mental Health today) at Yio Chu Kang, together with the patients.
During the Japanese Occupation, all nurses were required to attend Japanese-language lessons held in the hospitals on top of their regular lectures. Many nurses continued to serve valiantly throughout the difficult war period. With the departure of the Japanese forces after the war and the return of the British, the General Nurse Training course was reintroduced in 1946.

After the War in 1945, Singapore experienced its most difficult period in the area of political development and the vulgarities of a war-broken society principally related to secret societies’ activities. Violence disruptions arising from such matters became a norm and a daily and rampant occurrence. These compounded the difficulties to return to normal living, to work and to be educated.

After the Japanese left, the British Military Administration faced the enormous yet urgent task of primary healthcare - outpatient, maternal and child health and the school health service - was given top priority. A 10-year Medical Plan to improve Singapore’s health and medical services approved in 1948. Implementation began in 1951, with existing hospitals expanded and modernized, while many new outpatient clinics, maternal and child and infant welfare clinics welfare clinics were built. In the meantime, a Nursing Ordinance came into force in 1949 to regulate the registration, training and professional discipline of nurses, while a Medical Registration Ordinance was enacted in 1953, making houseman-ship compulsory for doctors. In 1955, the General Hospital’s Pediatric Unit was moved to the Mistri Wing, named after the donor Mr. N.R. Mistri. In 1956, the new School of Nursing in Sepoy Lines was opened to train more nurses for the expanding medical services. In 1958, the Institute of Health was founded, housing all the preventive health services for children under one roof.

World War II helped to change public perception of local nurses. In January 1947, the government promoted locally trained nurses to the rank of Sister, creating opportunities for them to rise to supervisory and administrative posts. The nurses, many of whom made positive contributions during the Occupation years and survived the war, were more confident of their abilities now and lobbied for their certification to be recognized in the UK and the Commonwealth as well as internationally. In February 1949, the Nursing Registration Ordinance was passed, requiring all nurses to be registered or admitted by examination.

While the post-war demands for nurses soared, the recruitment of student nurses was still abysmal mainly due to the lack of local women with the required level of education. To ease the shortage, nurse training for males was introduced in 1948. Existing male students from the Hospital Assistants training program were transferred to this new course. In addition, the
Catholic religious community came forward once again: nuns from the Franciscan Missionaries of the Divine Motherhood – many of whom were trained nurses and midwives – volunteered their services at the Tan Tock Seng Hospital between 1949 and 1962.

The early 1950s saw recruitment efforts being ramped up, with better prospects, training and promotion opportunities for nurses. Nursing was also portrayed in the media as a respectable career. The marketing efforts paid off and the number of student nurses grew considerably. But demand always seemed to outstrip supply and the nursing shortage persisted.

On 1st March 1951, the Assistant Nurse Training course was started at Tan Tock Seng Hospital to provide a bigger pool of trained nursing professionals. The course offered a path towards a career in nursing for girls without the required level of education and admitted students with Standard VII qualifications.

The new School of Nursing, managed by the Singapore General Hospital, opened at Sepoy Lines in 1956. The increase in the number of nurses led to the need and necessity to both document and implement proper nursing procedures. The Nursing Education Committee was set up in 1958 to oversee and regulate the various nursing training programmers. In 1959, the first Handbook on Nursing Procedures was published and saw great strides being made to raise the status of nursing in Singapore.

The Singapore Trained Nurses’ Association (today known as the Singapore Nurses Association) was founded in 1957 to promote the advancement of nursing as a profession, and in 1959 and
1961 respectively, the association was granted associate and full membership by the International Council of Nurses.\(^8\)

**Self- Government: 1959 – 1965**

Singapore attained self-government in 1959 inheriting from the 1950s death causing tropical diseases.\(^3\) Tuberculosis and pneumonia were the leading causes of death. The People Action Party (PAP) through its party’s professed policies founded on principle, not opportunism and with its constructive program of incorruptibility of economic and social reform began to work systematically on all areas of human endeavors including the problems of education, trade unions, social security, housing, rural development, health and the status of women towards expansion and higher achievements. It concentrated to work on the key ‘political’ issues of recognition as an effective honest and efficient government, its capability of uniting Singapore with the Federation of Malaya its infusion into our multiracial society the spirit of belonging to a Nation and its objective to obtain for the general masses of the people a happy, full and secure livelihood by transforming Singapore from a trading to an industrial society.

Notwithstanding, its inherited host of public health problems of high population growth, overcrowding, urgent industrialization program, poor food hygiene, vector-borne diseases and poor sanitation greatly taxed the ability of the Government. For the first Minister for Health, Mr. Ahmad bin Ibrahim, and his successors, these problems persisted well into the 1960s. However, during their tenure it also marked the beginning of reorganization and consolidation in healthcare services for the fledgling nation.

---

\(^8\) Singapore nurses had attained the international recognition and thus Nurses’ Week was celebrated for the first time in Singapore in May 1965. Held annually for nearly two decades, the program and activities organized during the week-long affair included graduation ceremonies for nurses and midwives, concerts, exhibitions, blood donation drives and charity fundraising projects. Nurses’ Week was changed to Nurses Day in 1985. It is celebrated on 1 August as it commemorates the exact date 131 years earlier when a group of French nuns in Singapore answered the call to become nurses – despite their lack of training and experience, and in the face of much public objection and protests. The nursing profession today has grown exponentially since 1965.
Independence: 1965 – 2015

Singapore’s First Government after Independence in 1965 was led by the then Prime Minister Lee Kuan Yew. Acknowledging the hosts of problems, the government adopted a pragmatic political approach to programming and planning/ designing.

Singapore’s three planned immediate priorities were firstly- to gain international recognition for its independence, secondly- to plan a strong defence that would “defend this piece of real estate and thirdly- to energize the economy- “how to make a living for our people” The queues ahead of health were national security, job creation, housing and education. Yong Nyuk Lin, the Minister for Health at that time, stated the situation clearly: “Health would rank, at the most, fifth in order of priority” for public funds. Thus acknowledging that politics is an institutionalized practice in the arena of the political wherein the agency of things- design and politics – is defined and executed as they are perceived, and become directly or indirectly influenced, by a political ideology. It confirmed what Claude Lefort had pointed out that the design acts to conceal the nature of the politics. However, there was a general societal acceptance and distinction of the political and the politics. The government was obliged to maintain all the existing facilities and to add new essentials in public healthcare.

Problems

Although “Health would rank, at the most, fifth in order of priority” for public funds, the government tackled the pressing problems. It planned primary care services closer to the people by developing a network of satellite outpatients dispensaries and maternal and child health clinics. These outpatient clinics were subsequently consolidated into modern polyclinics, small, well equipped medical-center. Services such as home-nursing and rehabilitative care for non-ambulatory patients have subsequently moved to voluntary welfare organizations, community hospitals, and private nursing homes.

The government when made aware of the substantial increase in the outpatient attendance on the introduction of western medicine, introduced co-payment gradually to minimize the financial burden to the state and to deepen the sense of value to the people for its use of the service and the medicine.

Health matters featured prominently in Singapore’s first national plan, covering 1961 to 1964, -The People’s Plan- balancing bold vision and hope with caution and practicality .It detailed
the multi-faceted challenges facing the nation. While priority was given to growing the economy, increasing manufacturing and trade, developing infrastructure, reducing unemployment, managing population growth and improving social services, significant funding support was given to public health policies and expanding medical services, on improving nutrition and public health education. It also championed immunization and continue the unrelenting fight against familiar diseases like cholera, polio, malaria and smallpox as well as emerging “urban” diseases such as cancer and heart disease.

Out of a national budget of $871 million from 1961 to 1964, $35.8 million was earmarked for health services. This was to build more district hospitals and maternity homes as well as expand facilities at the Tan Tock Seng, Singapore General, Middleton and Woodbridge hospitals.

**Planning**

Singapore’s reputation as an “economic miracle” after its unexpected departure from Malaysia in 1965 and the many accolades heaped upon it since makes the story of Singapore’s healthcare more intriguing and often to many defies easy categorization. Since 1965, the Government was acutely aware of the importance of the societal needs of caring for its populace including the elderly and elderly with infirmities. It started active planning and issued a White Paper (1983) upon achieving a level of military and economic stability and having achieved a GDP of over S$50 billion in 1983 (1964’s S$8.5 billion approximately) declaring its healthcare goals. The first comprehensive National Health Plan presented the government's broad health development strategies including keeping care affordable, meeting the demands of a growing population, and managing the rising expectations of an increasing affluent society and meeting the demand for the increased care for the rapidly ageing population. In time it began to focus on disease prevention through a healthy lifestyle – including exercise, eating healthy, managing stress, stopping smoking – along with screening for and optimal treatment of disease.

Furthermore, Singapore’s Medisave mooted in 1970s was enacted through the Medisave Act of 1983 which is a further emphasis on” healthcare being an individual responsibility”. After years of studying on the strength and weakness of subsidies and Medisave, Medishield was introduced into the healthcare lexicon in 1990 a risk-sharing model for financially demanding hospitalizations.

The goal of the restructuring of its public hospitals was to allow the public hospitals to compete against one another. The public hospitals were given a free hand to implement management
practices for improving effectiveness and efficiency, and much more freedom in their today decisions regarding staffing, compensation, deployment of resources, and some user fees. However, the public hospitals are still owned by the Ministry of Health (Health Corporation of Singapore (1985) a holding company - became MOH Holdings Private Limited.

The Government blueprint for a modern healthcare system began by the early 1990s. It recognized that healthcare costs were growing at an alarming rate that would soon put an unacceptable strain on the nation's as well as family finances. Its Ministerial Committee reviewed the role the government could play in containing costs, controlling subsidies, and ensuring the continued quality of care.

The White Paper (1993) “Affordable Health Care” stated the Government's philosophy and approach in five fundamental objectives. The five fundamental objectives impacting nursing homes are:

A. Promote Good Health:

Leading an active life needs an understanding of health education, disease prevention, and motivating the population to adopt a healthy lifestyle. Providing building exercise corners in all public housing, smooth pavements for people to walk and jog on, ensuring availability of healthier options at public food corners near public housing and transportation hubs, workplace health promotion programs and the healthier choice symbol on food are positive additions within the built environment.

B. Promote Individual Responsibility:

Discouraging overreliance on State Welfare/Third Party Medical Insurance helps to reduce the entitlement mentality from gaining hold.

C. Ensure Basic Medical Services for All Singaporean:

Having good, basic medical package available to all people regardless of their means and making the basic package affordable by hospitals with subsidies from government.

D. Engage Competition and Market Forces:

Instituting competition is hoped to promote efficiency and improvement of services and market forces instigate development of more choices for patients, and making sure patients are receiving good value for money.
E. Intervene Directly in the Healthcare Sector:

Correcting and/or redirecting the market are positive interventions. Also encouraging the private hospitals and clinics to seek government's funding with undertaking to provide support to the public helps indirectly to reduce capital expenditures for building more public hospitals and other care facilities.

Nursing Profession

Since Independence in 1965, the government has made every effort to encourage the recruitment of women and men to a nursing career. Nursing is defined as a profession that touches the lives of many at the point of care of the sick and infirmed.

Her or His learning experiences and contributions to the clinical care for patients make her/him an essential member in the healthcare team, who besides performing various nursing work, performs clinical assessments of patients from the physical, mental and social aspects, does medical and nursing procedures and facilitates treatment and delivery of patient care.

In addition, nurses can choose to perform clinical, management, education, an academic and research career; and can be a part of lifelong meaningful profession and opportunities to serve and care for your fellow men, women and children.

Ministry of Health (MOH) set up a National Nursing Taskforce in December 2012 to review and recommend ways to strengthen the development of the nursing profession. The Taskforce was led by a Steering Committee, co-chaired by Dr. Pauline Tan (Chief Nursing Officer, MOH) and Mr. Liak Teng Lit (Group Chief Executive Officer, Alexandra Health System). The Taskforce comprised over 60 representatives from the nursing and medical professions, public healthcare institutions, intermediate and long-term care (ILTC) institutions, post-secondary educational institutions, and the Agency for Integrated Care and MOH.

Their recommendations are in four key areas – (i) **Career Development**, (ii) **Autonomy**, (iii) **Recognition** and (iv) **Education** or “CARE” in short. The “CARE” program is to strengthen the development of the nursing profession and empower nurses to take on expanded roles.

**i. Career Development** includes revising the eligibility criteria for the part-time bridging course so that Enrolled Nurses who did not meet the requirement of 2.8 GPA in their NITEC nursing course will be eligible to enroll into the Nanyang and Ngee Ann Polytechnics’ bridging courses, as long as they have at least three years of post-
enrolment nursing work experience and employer’s testimonial and strive to make flexible and part-time work arrangements more accessible to nurses who need them.

ii. Autonomy means the need to expand nurses’ clinical accountability and decision-making authority, as we enhance the training of our nurses.

iii. Recognition includes a 5 to 20% increase in their monthly base salaries, in two stages: in 2014 and 2015. Second, a new annual Nurse Special Payment of 0.5 month will be introduced with effect from December 2014.

iv. Education is needed to help our nurses develop to their fullest potential, to support them in acquiring new knowledge and skills and to practice to the full extent of their training and education.

Minister for Health Gan Kim Yong on 6th August 2014 announced the acceptance of the Taskforce’s recommendations by MOH at the Nurses' Merit Award Ceremony with emphasizing nurses’ advancements bigger roles in ensuring that patients receive safe, appropriate and cost-effective care.

The Government’s efforts through ‘CARE’ are consistent with its pragmatic on-going plan to develop and institute measures to meet the demands and needs of a fast aging population. The Healthcare 2020 masterplan is to meet the growing demand for healthcare needs arising from an ageing population and the introduction of Medishield Life enhances the affordability of healthcare for all Singaporeans. The Intermediate and Long Term Care (ILTC) sector is also needed to support an ageing population. Nurses, equipped with higher skills and knowledge, play an important role in transforming Singapore’s our healthcare system.

Social Welfare and Public Healthcare Facilities and Public Housing

Singapore is a densely populated high income city state and it is composed of multiracial population. 5.31 million people and 3.82 million are residents (citizens and permanent residents) and 1.49 million are foreigners on a land area of only 714.3 square kilometers. The social problems of aging society is becoming serious in Singapore. In 2016, senior citizens (aged 65 and above) in Singapore formed 13.7% of the total population. The median age of the citizen population is 41.0 years. These figures rose from 9.2% and 37.0 years respectively, 10 years ago (2006). Moreover, it is expected that senior citizens will exceed 19% by 2030. The high rates of aging are attributed to the lower fertility rates as a consequence of the application
of population control policies of 1960 and 1980, in addition an increase in the average life expectancy; 78 for male and 83 for female. Chan (2010) sheds light on another aspect of this problem; she mentions that 80% of the families living with their elderly aged over 75 employ foreigners as caregivers which burdens care-providers on sourcing and employment of foreign staff.

Singapore does not regards itself as a welfare state but provides a social protection model which can be loosely referred to as the ‘Confucian’ welfare model, with emphasis on individual and family self-reliance and on community support welfare on public housing and health care. Public Healthcare facilities are closely related with Public Housing as they are responsible for the built environment of the people. Both are an important part of Social Welfare. Singapore’s Committee on Aging Issues two (2) out of four (4) strategic directions are: elderly-friendly housing and holistic affordable healthcare and eldercare with services and programs that are rationalized and streamlined so that the transition between step-down healthcare facilities and community-based facilities is smooth.

After World War II Singapore experienced an acute housing shortage. In 1947, a housing committee determined that, with a squatter problem worsening each year, 250,000 persons required immediate housing, while another 250,000 people would need new housing by the late 1950s. In 1960, the Housing and Development Board was established by the new PAP government. During its first five-year building program (1960–65), the board spent s$230 million to construct 53,000 dwelling units for more than 250,000 people. In the second five-year building program (1966–70), 67,000 additional units, accommodating 350,000 persons and costing s$305 million, were built. As of 2003, about 84% of the population resided in flats constructed through Housing and Development Board programs.

Singapore’s current targeted welfare program and social policy are in health and housing, taking 29.6% of Social Expenditure for 2008 with education and others constituting the remaining. Its vision of housing for the seniors is primarily elderly-friendly, one that allows and encourages older persons to live as part of the family in a comprehensive range of housing options and when circumstances dedicate that seniors have to live in community, good welfare-supported Healthcare services are provided.

Singapore's population enjoys one of the highest health levels in all of Southeast Asia largely attributed to good housing, sanitation, and water supply. Fully 100% of the population had
access to safe drinking water and 99% had adequate sanitation in 1994–95. Total health care expenditures were estimated at 3.2% of GDP.

There are 19 hospitals, five of which were administered by the government, and five were "government restructured." The remaining nine hospitals are privately run. The main multidisciplinary hospitals are Alexandra Hospital, Changi Hospital, and Tan Tock Hospital (all government run), and National University Hospital, Singapore General Hospital, and Toa Payoh Hospital (all government restructured). In 2004, there were an estimated 140 physicians, 26 dentists, and 424 nurses per 100,000 people. Life expectancy in 2005 was 81.62 years. That year, the infant mortality was 2.29 per 1,000 live births, the lowest in the world. The entire population has access to health care services.
Minister for Health Gan Kim Yong on 6th August 2014 announced the acceptance of the Taskforce’s recommendations by MOH at the Nurses’ Merit Award Ceremony:

“Inroduction

It is my pleasure to be with you here today to recognizes and celebrate the achievements of the Nurses’ Merit Award winners this year.

2. The nursing profession in Singapore has come a long way since it began in 1885. Today, the 36,000[1] skilled nurses form the backbone of the healthcare system. They work across the entire healthcare spectrum, from health promotion, disease prevention, care coordination to acute care and palliative care. Nurses care for their patients and families in a holistic way that often goes beyond clinical care to also include social, emotional and psychological support.

3. The scope and practice of nursing has also expanded over the years in response to our evolving healthcare needs. With an ageing population and rising incidents of chronic and more complex conditions, nurses have increasingly taken on greater roles and heavier responsibilities such as instituting first responder interventions, active patient and caregiver education, specialised nursing treatment and management of chronic diseases. The introduction of the three nursing career tracks – Clinical, Education and Management – in 2001 has allowed nurses to advance and take on bigger roles in ensuring that patients receive safe, appropriate and cost-effective care.

Changes in the Healthcare Landscape

4. To keep up with a growing demand for healthcare needs arising from an ageing population, we are building more capacity under the Healthcare 2020 masterplan. We are also introducing Medishield Life to enhance the affordability of healthcare for all Singaporeans. However, beyond increasing healthcare capacity and affordability, we need to also transform the delivery of care.
5. We need to step up upstream efforts on preventive health and encourage more Singaporeans to adopt healthy lifestyles so as to prevent or delay the onset of chronic diseases in the first instance. We need to rely less on acute hospital care and focus more on primary care in caring for seniors with multiple conditions. There is also a need to build up the Intermediate and Long Term Care (ILTC) sector to support an ageing population.

6. Nurses are at the forefront of this effort to transform our healthcare system, through the myriad of roles they play. It is an exciting time to be a nurse, as opportunities abound across care settings. More nurses will be needed, and we must equip our nurses with higher skills and knowledge and allow them to practice at the top of their license and lead the change in our healthcare system.

**National Nursing Taskforce Recommendations**

7. With these challenges in mind, the Ministry of Health set up the National Nursing Taskforce (NNT) to chart the future direction for the nursing profession. Chief Nursing Officer Dr. Pauline Tan and Group CEO, Alexandra Health System Mr. Liak Teng Lit, led the Steering Committee of the Taskforce. The Taskforce comprised more than 60 representatives from nursing, medical and administrators from the public and ILTC sectors, as well as representatives from nursing education and the Ministry of Health, to recommend ways to boost the attraction and retention of nurses, strengthen the Singaporean core in the nursing workforce and support the growth and development of the nursing profession. I would like to thank Pauline, Mr. Liak and the Taskforce for their hard work.

8. The Taskforce has made 15 wide-ranging recommendations, which have been accepted by my Ministry. The recommendations are in four key areas – (i) **Career Development**, (ii) **Autonomy**, (iii) **Recognition** and (iv) **Education** or “CARE” in short. The “CARE” program will strengthen the development of the nursing profession and empower nurses to take on expanded roles. Through “CARE” for our nurses, we hope that our nurses can in turn become better patient advocates. Let me now elaborate on the key recommendations in each area.

**Career Development**

9. On career development, nurses are an essential part of the healthcare workforce, and we want to give our nurses attractive career opportunities and pathways, so that they can fulfil their aspirations.
10. First, more Enrolled Nurses will have the opportunity to be upgraded. Today, Enrolled Nurses can progress to become Senior Enrolled Nurses and Principal Enrolled Nurses. We also recognize that many Enrolled Nurses aspire to become Staff Nurses so that they can take on higher responsibilities.

11. To help these nurses fulfil their aspiration of becoming a Staff Nurse, we will revise the eligibility criteria for the part-time bridging course so that Enrolled Nurses who did not meet the requirement of 2.8 GPA in their NITEC nursing course will be eligible to enroll into the Nanyang and Ngee Ann Polytechnics’ bridging courses, as long as they have at least three years of post-enrolment nursing work experience and employer’s testimonial. This recognition of prior working experience for upgrading will provide more progression opportunities for Enrolled Nurses.

12. Second, the apex of the nursing track will be re-designated from ‘Director of Nursing’ to ‘Chief Nurse’ to better recognize the size and span of control of the top nursing job.

13. Third, we will introduce a new Assistant Nurse Clinician (ANC) role to expose nurses to leadership development and opportunities earlier in their career. The creation of this new role will also enable good performing Senior Staff Nurses to assume supervisory and leadership roles earlier, under the guidance of their Nurse Manager and Nurse Clinician. ANCs will be team leaders who will contribute to professional capability building by providing supervision and clinical guidance to the less experienced colleagues.

14. Fourth, we will strive to make flexible and part-time work arrangements more accessible to nurses who need them. Very often, we hear about a nurse colleague who has to take a break from her career as a nurse because she finds it a challenge to balance her work with family commitments. For a profession where over 90% are female, and who may also have to care for young children or elderly parents at home, we can do more to provide flexible work arrangements to retain such nurses. With an aging nursing workforce, part-time work options can also allow us to better tap on the experience of older nurses who would otherwise have retired.

**Autonomy**

15. Our nurses must not only have a sense of purpose, mastery in skills and competencies, but also the autonomy to discharge their roles effectively. Autonomy is our second area of focus under CARE.
16. First, we need to expand nurses’ clinical accountability and decision-making authority, as we enhance the training of our nurses. Nurses’ roles will be expanded to enable them to make protocol-based diagnoses and investigations for certain disease profiles and to order treatment. MOH will also be working towards granting experienced senior nurses, i.e. the Advanced Practice Nurses (APNs) and Nurse Clinicians, the authority to prescribe medicines for stable patients when they work alongside doctors collaboratively.

17. With advancement in nursing education, nurses are capable of taking greater initiative for patient management. They will play greater roles, for example, in running nurse-managed rehabilitation wards, nurse-led clinics and nurse-initiated referrals. Some of these ‘expanded scopes’ are already successfully practiced in our public healthcare institutions.

18. For example, APNs Karen Koh and Ng Wai May, this year’s President Award winners, have successfully initiated and are managing APN Cardiac Rehabilitation and APN Stroke clinics, respectively.

19. Karen helps post-discharge cardiac patients to have better control of their conditions. She supports them to adopt a healthier lifestyle. She typically reviews patients’ rehabilitation progress, detects emerging signs and symptoms and looks out for any side effects of medications. She orders the necessary investigations and manages medical treatment as required.

20. At the Stroke Clinic, Wai May does a comprehensive assessment of patients with neurological deficits and monitors their recovery. She orders appropriate investigations, detects any adverse effects of medications and works with patients to manage their risk factors. She also provides stroke education to patients and their family members.

21. In KKH, Nurse Midwives provide independent midwifery care for low-risk pregnant women in the 28- to 38-week gestation period. They also follow up on postnatal mothers with uneventful normal delivery.

22. My Ministry will work towards enabling nurses to practice at the top of their competencies, training and education

23. Second, nurses need to be supported by automation and the use of technology. As part of the drive for higher productivity and innovation in the healthcare sector, public healthcare
institutions have been adopting technologies that will help ease the workload of nurses and support them in their work.

24. Tan Tock Seng Hospital (TTSH) implemented SmartSense system in 2008 to automatically monitor and record patients’ vital signs in real-time. Their nurses are able to perform these checks unobtrusively on patients, without disrupting rest. The potential for human errors in vital signs recording has also been minimised. This year, the system has been enhanced with the Aggregate Warning Score (AWAS) algorithm to expand the real-time monitoring to include patients’ systolic blood pressure, heart rate, respiratory rate and oxygen saturation. This smart hospital system now alerts nurses on any clinical deterioration, and proactively highlights the urgency and scale of attention needed. Treatment has become more-timely as a result. This technology not only improves the productivity of nurses by reducing the amount of time they spend monitoring vital signs, it is also transforming the way nurses are delivering care by raising the bar on patient safety and quality.

25. Khoo Teck Puat Hospital (KTPH) has also eliminated the need for nurses to do manual charting of vital signs, as the medical device interfaces now allow the data to flow directly into the Electronic Medical Records system. IP telephony and instant messaging have also been implemented to improve communications and strengthen collaboration between nurses and doctors, instead of relying on conventional phone calls and SMSes.

26. We will continue to encourage nurses to lead project teams to identify, engage and disseminate best practices across the healthcare institutions to promote better patient care and system optimization. Besides investing in automation and use of technology, we will also invest in upskilling support care staff to better support the nurses by taking over work delegated from nurse

**Recognition**

27. I have covered the ‘C’ and ‘A’ in CARE – Career Development and Autonomy. Let me now move on to ‘R’ – Recognition.

28. To ensure that the recognition for nurses is commensurate with their expanding roles and competitive with the market, the NNT has reviewed the pay of public sector nurses. Nurses in public healthcare and MOH-subverted ILTC institutions can look forward to two key enhancements. First, they will receive a 5 to 20% increase in their monthly base salaries, in
two stages: in 2014 and 2015. Second, a new annual Nurse Special Payment of 0.5 month will be introduced with effect from December 2014.

29. These salary enhancements are part of our continuous efforts to better attract and retain nurses in the public healthcare sector, and ensure salaries remain competitive.

30. In recognition of the important work of nurses, we will enhance the national nursing awards. These will include the President Award for Nurses and Nurses Merit Award. I’m pleased to note that the Lee Foundation has also expressed their support by stepping up the quanta for the Tan Chin Tuan Award for Enrolled Nurses

**Education**

31. Finally, we need to invest in Education to help our nurses develop to their fullest potential. We must constantly support them in acquiring new knowledge and skills and to practice to the full extent of their training and education.

32. The NNT recommends better support for nurses in acquiring advanced knowledge, inquiry skills as well as leadership capabilities, and to practice nursing at the top of their license.

33. APNs play a key role in our healthcare system as leaders and educators. The APN internship will be enhanced to make it more structured and standardized across the healthcare system to meet national needs. To address expanding healthcare needs, we will develop more APNs to be based in the wards to manage Inpatients, helm APN clinics to manage chronic diseases at the Polyclinics and Community Health Centers and lead community and home care teams in the ILTC sector.

34. Next, post-registration nursing training will be recalibrated to be broad-based with an added emphasis on community nursing and rotation to the intermediate and long term care. This change is necessary to equip nurses to manage patients who today, present with multiple clinical care needs and co-morbidities regardless of setting or institution. It will also help enable nurses to deliver holistic and integrated practice across the various care settings.

35. At the same time, more nurses can look forward to sponsorships for upgrading programs. My Ministry will increase funding for sponsorships for EN bridging courses, diploma and advanced diploma courses as well as, degree and masters programs so as to
support nurses in lifelong learning and the continuous development of their skills and knowledge.

36. To anchor our efforts in nursing education, a National Council of Nursing Education will be set up under the auspices of the Chief Nursing Officer’s (CNO) office to oversee and enhance nursing education training and development. The Council will serve as a national level body to coordinate and monitor the quality, adequacy and standards of nursing education.

Conclusion

37. Through their dedication and commitment, they have touched the lives of many patients and their family members. My Ministry is committed to continue our efforts to support and promote the nursing profession. Together, we can make a difference to the lives of nurses who have made a difference in ours.

I congratulate our 81 Nurses Merit Award recipients. On this note, I wish you all a Happy Nurses Day!”
APPENDIX C

SUMMARY REPORT ON 9 EXISTING NURSING HOMES IN SINGAPORE
<table>
<thead>
<tr>
<th>S/N</th>
<th>Description</th>
<th>Simel Care Centre</th>
<th>Peace Haven Nursing Home</th>
<th>Econ Nursing Home</th>
<th>Lions Home</th>
<th>Apex Harmony Lodge</th>
<th>Hougang Care Centre</th>
<th>Taipei Social Services</th>
<th>Sun Love Homes</th>
<th>Pelangi Village</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Photos</td>
<td><img src="https://example.com" alt="Images" /></td>
<td><img src="https://example.com" alt="Images" /></td>
<td><img src="https://example.com" alt="Images" /></td>
<td><img src="https://example.com" alt="Images" /></td>
<td><img src="https://example.com" alt="Images" /></td>
<td><img src="https://example.com" alt="Images" /></td>
<td><img src="https://example.com" alt="Images" /></td>
<td><img src="https://example.com" alt="Images" /></td>
<td><img src="https://example.com" alt="Images" /></td>
</tr>
<tr>
<td>2</td>
<td>Information</td>
<td>Rehab Centre; 1 Block of 9 floors (tower) and 4 floors (atrium) houses 150 beds with 40 Staff of which 80% are foreign. Mall like environment conducive to young adults with Atrium Skylight and able to</td>
<td>Dementia, Nursing, and Psychiatric home which started operation in 2000. The 21 million dollar home has 401 beds (395 beds + 6 isolation beds), 13 RLA (Resident Living Areas) with theme “prosthetic” Dementia and Elderly home which started operation in 2003. The 14 million home houses 200 beds in 5 atriums and 4-storey building using timber as main material for its finishes. The facility is card-accessed and a Nurse</td>
<td>Dementia; The $13 million lodge which started operation in 1999 has 3-storey levels with 210 beds housed in 7 wards is situated in a 6500sqm lot. It has 3 wings with small self-contained units over</td>
<td>Dementia; 5-storey care centre constructed in 2002 housing 176 beds in 3 male wards and 1 female ward. Equipped with full A/C and accessed through Cards in Main door and wards, the centre follows IMH layout</td>
<td>Dementia, Elderly, Psychiatric, and Rehabilitation Facility. Houses 4 wards namely Ward 56 (22-bedded type) = 147, Ward 34 (6-bedded type) = 40 beds, and Ward 36B (4-bedded type for rehab)= 30 beds. Ward 33 has 43 beds.</td>
<td>Psychiatric Nursing Home; The $57-million home is comprised of 7 buildings situated in 5800sqm land that is divided into two wards. Tembusu Ward 51 for male with 203 beds and Thuya Ward 65 for female with 201 beds.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### APPENDIX C
SUMMARY REPORT ON 9 EXISTING NURSING HOMES IN SINGAPORE

<table>
<thead>
<tr>
<th>3 External Areas</th>
<th>Features</th>
<th>Sun shading louvers and an Atrium Skylight. Landscaped with perimeter planting and water features (but not working). A Circulation space is built around the atrium.</th>
<th>A Mansion-like building with perimeter planting, trellis, swimming pool (Hydro), foot reflexology garden, full height windows, and various grille systems. Landscape need not be near rooms and courtyard and air-wells must be avoided to prevent noise and smell transmission.</th>
<th>A perimeter landscaping with small pond and extended gardens that borrow neighbour's open green spaces. The nursing home can be a commercial-driven facility.</th>
<th>With warm and timber feel. The home is landscaped with water features and lighting designs. 8 bedded rooms are equipped with BHP (Electrical Only and Nurse's Call) MATV sockets with high up ceiling. All extinguishers concealed.</th>
<th>Perimeter Landscaping with Water feature at the drop-off. Sensory zones and Gardens.</th>
<th>Part of IMH's structure.</th>
<th>No landscaping and water features.</th>
<th>Provided with small landscaping areas and water features, it has prayer areas, guard house, and bicycle areas.</th>
<th>Perimeter Landscaping with Water feature.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Public Areas</td>
<td>It has no reception and a limited space for Visitor's Lounge/Waiting Area (overflows to canteen). It has a Day Care, a Multi-purpose Hall with foldable walls of 18 Pax capacity and a Surface Car Park.</td>
<td>It has a Reception area with small Visitor’s lounge with atrium, a centralized A/C small training room, and surface car parks. Avoid small niches in the building design.</td>
<td>It has a Reception area, a small visitor’s lounge with toilet and an open space which serves as a multi-purpose area. Car parks are found the basement. Allows guests to go directly to the residents.</td>
<td>It has reception areas and atrium space are used as visitor’s lounge with common toilet. The home has 2 multi-purpose halls; restroom rooms equipped with A/C and CCTV surveillance, and Car Park.</td>
<td>Complete with Reception, Visitor’s Lounge, Visitor’s Toilet, Multi-purpose Hall, and Day Care Centre with Dining, TV area, Kitchen, and Fans, Car Parks.</td>
<td>Provisions for OHP and Stage c/w slide.</td>
<td>It has a reception area, a multi-purpose hall, common toilet and a Car park.</td>
<td>Open concept reception area with Card Access visitor’s lounge equipped with fans, CCTV, A/C and PA system. Internal Nursing Station is enclosed and equipped with all the services.</td>
<td>It has a reception area, a visitor’s lounge, and a multi-purpose hall cum dining hall with a capacity of 150 persons. It has a Day Care Centre; beds lift with a capacity of 25 persons, and provisions for surface and covered parking.</td>
<td>It's Public areas include a reception area, a multi-purpose hall which is a part of canteen and basement and surface parking. Provisions of treatment rooms c/w A/C and fans.</td>
</tr>
<tr>
<td>5 Common Facilities for the Canteen only has 3 stalls but no Dining Area.</td>
<td>Common day lounged within the wards and a Dining</td>
<td>Common day lounge/activity area is found at 4th floor. Fake bus stops, use of specific design elements for non-</td>
<td>Each ward has a visitor’s lounge Dining Hall c/w fans</td>
<td>Common Activity Area and the Dining Hall cum Multi-</td>
<td>Dining hall has a capacity of 240 people including a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### SUMMARY REPORT ON 9 EXISTING NURSING HOMES IN SINGAPORE

<table>
<thead>
<tr>
<th>Residents</th>
<th>Hall.</th>
<th>Dining</th>
<th>pharmacological intervention.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has various activity lounges. Workshops are provided for sponsor’s needs</td>
<td>Avoid crossing/movement of different traffic for infection control.</td>
<td>Garden space is used for outdoor activities.</td>
<td></td>
</tr>
</tbody>
</table>

| 6 Dorm Facilities | See Photo: Mix and full floor gender dorms c/w sprinkler system, CCTV system, Card System at main entrance. Each dorm level has Reception, Warden Room/ isolation Rooms/ and toilet cum laundry. Toilets are centralized and found at both ends. It is able to have a central control and mix wards and open plan with dry wall partition for flexible planning. Administration with A/C (cassette units), Most areas are ventilated through electric fans, Night lightings along corridors, Louvered windows with grilles, % drywall partition, and isolation/treatment room at the lobby. | See Photo: Single Rooms and Mix and full gender dorms of 21, 32, and 39 beds with attached toilets. Each ward has Nurse station, A centralized toilet and activity areas within and outside the dorm. Dorms have Kitchen (no pre-heat), activity cum dining room area, assisted and non-assisted toilet and bath, treatment room cum nursing station, and therapy corner. Need for Nurse stations and Nurse Resting Areas. | See photo: Average of 42 beds per floor. Dorms are 8-beded with curtain railings and attached toilet. Provisions for centralized toilets are also available. Has 3 lifts, 2 of which are passenger lifts and 1 is a goods lift. The dorm has a Nurse station at the main entry and has common facilities like visitor’s lounge, PT/OT consultation room, consultation room, treatment room, time out room and isolation room. Most of the patient has to be assisted in going to the toilet. Custom-built isolation/holding room and reminiscence room. |
| Purpose hall is equipped with Fans, CCTV, MATV. | Multi-purpose hall, stage, lights, fans, and CCTV. Medication rooms with A/C, fans, Hard lines, Internet, PA, and SD. | Common dorm facilities include TV room/ dance mirror/ single room, toilet and bath, assisted toilet and bath. nurse stations are located outside dorms. Common facilities shares with IMH facilities. Interview rooms are accessed via card. | See photos; it has 2 dorms of 32 beds each total of 64 beds. It has common facilities within and outside dorms and features an outdoor walking ledge. Nurse station is located centralized within the dorm. |

It has 2 lifts, 1
### Summary Report on 9 Existing Nursing Homes in Singapore

**Rehabilitation Services**
- Has Physiotherapy and Occupational Therapy Rehabilitation Facilities with Gym and Workshops.
- Also works with external sponsors for OT.
- Has Physiotherapy and Occupational Therapy Rehabilitation Facilities with Hydro Swimming Pools.
- Outdoor Spaces are needed.
- Has Physiotherapy Rehabilitation Facility that offers TCM on same level.
- Has Physiotherapy and Occupational Therapy Rehabilitation Facilities with Gym.
- Treatment rooms has A/C, Nurses station has CCTV, Nurse's call system, and fans.
- Has Physiotherapy and Occupational Therapy Rehabilitation Facilities provided within PT and OT.
- Sensory Garden

**Clinical Support Facilities**
- Dental Clinic with full facility and Play rooms with break glass, CCTV cameras, and fans only.
- Nurse stations are equipped with CCTV and fans.
- Provision for a central pharmacy and a Dental/consultation room.

**General Support Facilities**
- Canteen with pantry, Toilet cum laundry with cleaner's room inside.
- Store Rooms and M&E closets are provided and Trolley and Wheelchair bags under staircase.
- Must keep service rooms well hidden, and needs goods lift and store rooms for workshops.
- Cleaning incurs high cost and food via normal lift is not ideal. Suicide room should not be centralized.
- Has in-house Kitchen and Kitchen store/Ration store.
- Laundry for dirty linen is outsourced.
- Has in-house Kitchen with kitchen store/Ration store, cold room, and auto dishwashing. Food is cooked and served from a choice of menu.
- Provision for in-house laundry using LPG usage with Clean Linen Area, Dirty Linen Area, Maintenance office and Cleaner's Room. There is also a provision for refuse.
- General kitchen with outsourced food ("Kopitiam Environment"). Available Kitchen Store and Ration Store is available.
- Provision for Auto dishwashing.
- Fan-ventilated Areas including the Dining Hall
- In-house kitchen with foods cooked and served from a choice of menu. It comes with Auto dishwashing and an in-house laundry area.
- Has in-house kitchen. Food is cooked and served from a choice of menu. It also has a provision for Kitchen store, Cold room, and a Halal Kitchen.
- In-house laundry with in-house clean and dirty linen area.
- CCTV cameras in wards and corridors. The central pharmacy is found at the 3rd floor.
- Has kitchen with kitchen store, cold room, and an auto dishwashing area. A separate Halal kitchen (on a 3rd party preparation).
- In-house laundry using LPG and electricity with Clean and Dry linen area. Provision for Refuse chute, maintenance office, and cleaner's room is also available.
<table>
<thead>
<tr>
<th>No.</th>
<th>Facilities</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Administration and Counselling Facilities</td>
<td>Administration and Counselling Rooms have vision glass and Meeting Rooms cum Training Room are equipped with OnP and A/C. Spaces can double up for multi-uses. Small training rooms. Spaces should double up for multi-use and it is important to have training spaces. Has Administration Office.</td>
</tr>
<tr>
<td>11</td>
<td>Staff facilities</td>
<td>Provided with staff lounge with pantries, a Staff Library, and a Foreign Staff Quarter at the last floor. Providing Staff Quarters is good for administrative purposes. Foreign staff workers use wards spare beds. Staff quarters useful for admin purposes. Lions home make its staff as part of their family environment by providing facilities as staff cafeteria, staff recreation, Common Staff toilet and shower and a staff quarter for foreigners at the 4th floor. Provision for Staff Quarters with Toilet and shower in a homely environment.</td>
</tr>
<tr>
<td>12</td>
<td>Training facilities</td>
<td>Has Auditorium of 180 pax capacity with AV system, Multi-use Conference Rooms. Has no smoke curtain at atrium area. Small training rooms. Has Lecture and training room and offers Bachelors of Nursing and Certificate in Health Care Courses. Training Rooms c/w A/C. No Isolation Rooms only “Containment” Rooms. Training room cum multi-purpose room. Provision for Training room</td>
</tr>
</tbody>
</table>

**APPENDIX C**

SUMMARY REPORT ON 9 EXISTING NURSING HOMES IN SINGAPORE

Mie University, Graduate School of Engineering

三重大学, 大学院工程研究科

Administered office, Conference rooms, Counselling Rooms and Interview Room. There is no provision for Nurse call system in this area.
<table>
<thead>
<tr>
<th></th>
<th>Other Facilities/Features</th>
<th>Workshop Areas c/w AC/ with fans and sprinkler systems, and CCTV cameras all over. Basketball court at roof top with roof top garden planter protection/gym, library, music room, pool table, football table, and youth room.</th>
<th>Swimming Pool and Sensory Room</th>
<th>Outdoor balcony c/w gym and a Hairdressing Area.</th>
<th>Internet Room/Thrift shop/Basketball Court/ Pets corner/Dance mirror/gym/ and music corner</th>
<th>Workshop rooms are available.</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td><strong>Security and Safety</strong></td>
<td>Site is situated in an island with Perimeter Fencing. Equipped with CCTV and accessed through one central entry point. Lift lobby is found before the reception and with lowered windows and grilles.</td>
<td>Site is fenced along boundary and accessed through one central point of entry with full height windows with various grille systems. Lifts re placed along corridors.</td>
<td>Site is fenced along boundary and accessed through one point of entry. Has long corridors from dorm to manydoors and lift lobby and equipped with CCTV.</td>
<td>Open Lift Lobbies with CCTV. Design of Lobby doors in relation to the streets.</td>
<td>Accessed through a reception and is fenced along site boundary and equipped with CCTV.</td>
</tr>
<tr>
<td>14</td>
<td><strong>Patient Flow</strong></td>
<td>Spaces are accessed through stairs and lifts. Must not share passenger and goods lift for infection control. Avoid too many small corners/niches. Need proper public and resident zones.</td>
<td>Spaces are accessed through lifts.</td>
<td>Spaces are accessed through lifts.</td>
<td>Spaces are accessed through lifts.</td>
<td>Card access system. Extinguishers are found in strategic locations.</td>
</tr>
<tr>
<td>15</td>
<td><strong>Working with the Community Hospital</strong></td>
<td>Multi-purpose rooms-cum workshops rooms are provided for community programmes.</td>
<td>Nursing Home is under Salvation Army</td>
<td>Nursing Home is under Salvation Army</td>
<td>Nursing Home is operated by a private sector.</td>
<td>Nursing Home in under Lion’s Club</td>
</tr>
<tr>
<td>16</td>
<td><strong>Patient Mix and Staff Strength</strong></td>
<td>Under Category 1: Ambulant Psychiatric Patients of Mix. Under Category 3 and 4. Facilities for Private Nursing Home with mix-gender rooms and Category 1, 2 and 3: Mentally disabled w/ physical needs and Dementia patients.</td>
<td>Category 1 and 2: equipped with Dementia patients.</td>
<td>Category 1 and 2: equipped with Dementia patients.</td>
<td>Category 1 and 2: 50%. Category 3 and 4: 50%. Residents are of mix gender with a</td>
<td>Falls under category 1 and 2 with residents are</td>
</tr>
<tr>
<td>18</td>
<td>Lifts</td>
<td>2 lifts: 1 passenger and 1 fire lift segregated at lift lobby. To separate goods/service lift from passenger lift.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Transporta on of Food</td>
<td>Pantries are provided. Via lift, food is heated through Bain Marie. Provide segregation for cross contamination.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Transporta on of linen/medici ne supplies</td>
<td>Toilet cum laundry. Via lift. Avoid mixing use of lifts for infection control.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Transporta on of dirty linen and waste</td>
<td>Toilet cum laundry. Via lift. Provide larger lift for service efficiency.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Waste</td>
<td>To separate goods/service lift from passenger lift. Provide segregation for cross contamination.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>IT System</td>
<td>Selection of call equipment to suit different patient types.</td>
<td>Avoid mixing use of lifts for infection control.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Video</td>
<td>Simple</td>
<td>management. Provide segregation for cross-contamination.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Sight</td>
<td>Its Mansion-like environment creates an impression of &quot;new and modern facilities&quot;</td>
<td>Use of Server Rooms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hospital-like environment creates an impression of premium service in terms of care.</td>
<td>Simple IT Infrastructure system with Wi-Fi, RF Tagging, and capable of tracking patients.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Smell</td>
<td>Pleasant and Hospital-like</td>
<td>The size of the structure creates an impression of luxury both in facilities and spaces.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Taste</td>
<td>Homely and Familiar</td>
<td>Chalet-style structure creating an impression of home, or vacation-like area.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Homely and Familiar</td>
<td>Hospital-like environment creates an impression of premium service in terms of care.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Hear</td>
<td>Quiet and peaceful, Homely</td>
<td>The size of the structure creates an impression of luxury both in facilities and spaces.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quiet and Peaceful but sometimes busy Due to its hospital-like environment</td>
<td>Hospital-like environment creates an impression of premium service in terms of care.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Feel</td>
<td>A feel of mall-like environment. Mansion-like, landscaped with water feature creates a relax and calm feel.</td>
<td>Having a home-like environment creates a feeling of familiarity and belongingness to each new resident.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hospital-like impression creates a feel of security to its residence and assurance for the families.</td>
<td>Hospital-like impression creates a feel of security to its residence and assurance for the families.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

SUMMARY REPORT ON 9 EXISTING NURSING HOMES IN SINGAPORE

Mie University, Graduate School of Engineering
APPENDIX D
EXISTING GOVERNMENT-BUILT NURSING HOMES

1) Bright Hill Evergreen Home (Completed in 2013)
Address: 100 Punggol Field, Singapore 828811
No of Storeys: 9, Capacity: 248 beds

Bright Hill Evergreen Home (BHEH) is a 248-bedded, accredited non-profit nursing home for residents above 50 years old without any family support, totally dependent on public assistance and lower income families. Its key focus is the physical and mental wellbeing of each individual resident. Physiotherapists provide exercises to improve or maintain residents’ physical conditions, and occupational therapists aim to improve or maintain residents’ cognition level, organize activities of daily living functions and engage them in different meaningful activities. BHEH also provides psychotherapy and counseling to residents and families to address their present or underlying issues enabling them to work towards resolving their difficulties and over-coming the challenges they face. BHEH aims to adopt a holistic approach of care and support to the residents with involvement of their family members.

2) Singapore Christian Home (Completed in 2013)
Address: 20 Sembawang Crescent, Singapore 757092
No of Storeys: 9, Capacity: 248 beds

Singapore Christian Home is a non-profit outfit committed to caring for destitute and persons from very low-income families requiring long term medical and nursing care. With the age of the residents ranging from 13 to 105 years, 89% of residents are from the lowest income group while 25% of residents do not pay for their monthly maintenance fee charges. Before the Home was moved to its current premises in Sembawang Crescent in 2013, it was operating at Jalan Tan Tock Seng and its bed capacity was 75. With the demand for nursing beds, the Home was approached by the Ministry of Health in 2009 to run a new 9-storey nursing home with 248 beds. The service includes nursing care and daily activities assistance, medical, physiotherapy, respite care, dietary services, social activities and financial assistance.
3) **All Saints Home (Yishun)** (Completed in 2015)
   
   Address: 551 Yishun Ring Road, Singapore 768681
   
   No of Storeys: 4, Capacity: 183 beds

   All Saints Home is a Voluntary Welfare Organization (VWO) that provides comprehensive and professional eldercare services to the aged of all backgrounds. The Yishun home for the elderly has a **Community Rehabilitation Program** that offers individually tailored physiotherapy and occupational therapy for day clients. The home reignites the kampong spirit with its community-based activities. To bring rural life into Yishun and promote interaction, residents and volunteers are encouraged to grow and harvest their favourite flowers, herbs and fruits at the Community Garden. Seniors in the neighbourhood are welcome to visit the home, exercise and enjoy a hearty bowl of nutritious soup prepared by our soup prepared by their community-based Share-a-Pot project in collaboration with Alexandra Health.

4) **All Saints Home (Jurong East)** (Completed in 2015)
   
   Address: 20 Jurong East Avenue 1, #01-01 Singapore 609792
   
   No of Storeys: 7, Capacity: 194 beds

   All Saints Home (Jurong East) home for the elderly commenced operations in September 2015 and it is one of the first few nursing homes to be accredited as an Approved Service Provider by Ministry of Health. The home focuses on nursing and medical care, short and long term rehabilitation, physiotherapy and occupational therapy, resident social life, social work and management and care for dementia. The home has a 49-bed **Dementia Care Ward** to care for residents suffering from dementia. Its **Therapeutic Outdoor Garden** provides the safe and green space needed by residents (especially those with dementia) to wander and enjoy.

5) **Ren Ci Nursing Home** (Completed in 2014)
   
   Address: 31 Bukit Batok Street 52, Singapore 659251
   
   No of Storeys: 7, Capacity: 257 beds

   Ren Ci is a VWO, dedicated to provide affordable medical, nursing and rehabilitative care services to the elderly community. Ren Ci took over the Pavilion Wards in 1999, which previously belonged to Tan Tock Seng Hospital. It housed 150 Chronic Sick beds and added 120 Nursing Home beds. In December 2008, after transferring the Chronic Sick patients to the purpose-built Ren Ci Community Hospital, the facility was converted to a
full-fledged nursing home located at Jalan Tan Tock Seng (Moulmein). Despite this increase, the demand for beds at the Ren Ci Nursing Home is still very high, with consistently close to full occupancy rate. In line with the government’s efforts to prepare Singapore for a greying population, Ren Ci Nursing Home at Bukit Batok has commenced operations in January 2015. It provides dementia care services, rehabilitation and day care services, besides nursing home services. Amenities in and around the nursing home include a living/dining room area where residents can enjoy activities in the day, and a roof garden that families and visitors can use during their visits.

6) Lions Home for the Elders (Bishan) (Completed in 2015)
   Address: 9 Bishan Street 13, Singapore 579804
   No of Storeys: 6, Capacity: 230 beds
   Lions Home for the Elders is a Voluntary Welfare Organization (VWO) that actively promotes and employs best practices on providing services and programs for the ageing community. It was initiated and established by Lions Clubs of Singapore. Founded in 1980, the first community home for the aged destitute housed 18 residents. Today it has grown and expanded the services and capabilities to include a holistic approach in aged care. Now a voluntary welfare organization, which is also one of the first few nursing homes to be accredited as an Approved Service Provider by Ministry of Health.

7) NTUC Health Nursing Home (Jurong West) (Completed in 2015)
   Address: 50 Jurong West Street 93, Singapore 48967
   No of Storeys: 6, Capacity: 294 beds
   NTUC (National Trades Union Congress) Health’s eldercare services, delivered previously through NTUC Eldercare, were first introduced to Singapore in 1997 to provide affordable eldercare services to middle-income households. It works closely with the government, and has partnered with them over the years to initiate pilot projects for the eldercare sector. NTUC Health Nursing Home is NTUC Health’s first nursing home. It provides professional, person-centred and holistic care with focus on rehabilitating residents back to the comfort and familiarity of their own home/ community.

   NTUC Health Nursing Home (Jurong West) works with the NTUC Health team of professionals such as Doctors, Dentists and Pharmacists, as well as its established network of Home Care and Day Care services. It also works closely with the Regional Health Systems and community partners in the West to provide optimal care for its residents. The
facility also houses the Silver Circle Senior Care Centre, which can serve up to 60 seniors. Two more nursing homes in Geylang East and Chai Chee are expected to be operational in 2017.

8) **Villa Francis Home** (Completed in 2013)

   **Address:** 91 Yishun Central, Singapore 768829
   **No of Storeys:** 9, **Capacity:** 240 beds

Villa Francis Home for the Aged was set up to provide inpatient nursing care for the destitute poor and sic regardless of race or religion. In 2003, Catholic Welfare Services (Singapore) took over the management of Villa Francis from the F.M.D.M Sisters (Franciscan Missionaries of The Divine Motherhood). The home moved to its new site in 2013. Villa Francis Home emphasizes the importance of maintaining a positive attitude towards life in spite of ageing and illness and to stay physically, socially, emotionally and spiritually engaged. Volunteer doctors and consultants pay attention to the medical needs of our elderly patients, while nutritionist ensures the residents have proper meals to suit their conditions. Beyond Nursing and medical care, their services include effective rehabilitation, including Physiotherapy and Occupational therapy, pastoral/spiritual care and caregivers educational programs.

9) **St. Andrew's Nursing Home (Psychiatric Nursing home)** (Completed in 2013)

   **Address:** 60 Buangkok View, Singapore 534191
   **No of Storeys:** 7, **Capacity:** 300 beds

The 300-bed, 7-storey purpose-built facility is Singapore's fourth and largest psychiatric nursing home to provide long-term care for residents suffering from psychiatric illnesses. It was designed and built by the Ministry of Health together with the Institute of Mental Health. The building comprises 10 wards, each ward having its own day activity area where exercises and social activities are conducted. It also includes a multi-sensory room designed to stimulate the senses and promote self-soothing for agitated or distressed residents. A specialised Dementia Care Ward enables its residents' direct access to a discreetly enclosed garden where they can engage in physical activities and enjoy the outdoor space safely without wandering too far or getting lost. Refer to Chapter 4 for detailed case study on Planning, Designing and Constructing of St. Andrew's Nursing Home


PRESENTATIONS AT INTERNATIONAL CONFERENCES


Mori Shiho, Chan Seng Kee, Shinohara Yoshinori, Tani Homare, Higashizono Hirofumi, Sano Yoshihiko, Kato Akikazu (2011). Which is Better a Single Bed Room Versus a Multiple
bed Room in a Hospital?, Analysis on Asian Way to Develop the Inpatient Environment, UIA 2011 TOKYO the 24th World Congress of Architecture Academic Program, poster presentation 30421, ISBN 4-903378-09-1.
