

# Technology & Nursing: Evolution or Revolution

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# Learning Objectives

- Verbalize understanding of the impact of technology on nursing practice over time
- Identify consequences of changing technology in clinical practice
- Explore the use of technology to support a reformed health care environment of the future



# Revolution vs Evolution

- “Revolutionize” means to bring about a radical change or to alter extensively or drastically.
- “Evolutionary” means gradually changing or progressing.
- Revolutionary change is generally followed by evolutionary change until the next crisis or major discovery appears.



# What Kinds of Technologies

- Clinical
- External
  - Regulatory
  - Patient/consumer expectations
- Information Management



# Revolutionary Clinical Technology

Introduction of a radically new piece of equipment or procedure set the stage for increasingly complex approaches.

Examples include:

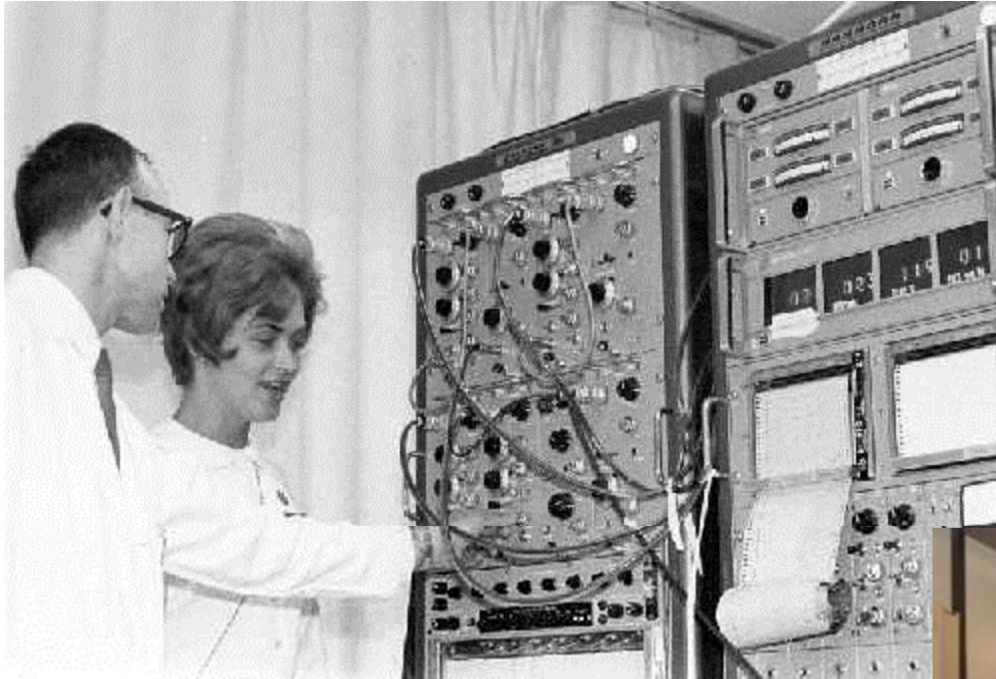
- Respiratory care
- Monitoring
- Medical devices



# Respiratory Care



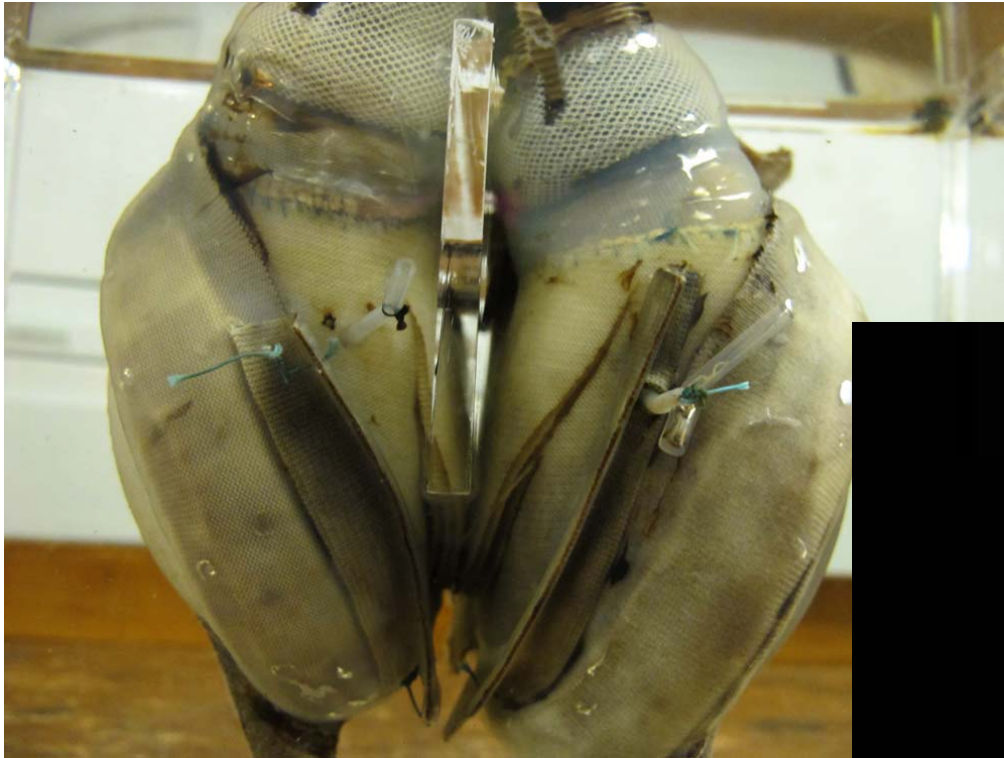
# ICU Room



Circa 1965 – ICU Monitoring Equipment (Pennsylvania Hospital Historic Collections)



# Artificial organs



# Revolutionary Therapies

- 1910s – 1920s: X-rays and EKG
- 1950s: cardiac catheterization, pacemakers, cardiac drugs, monitoring
- 1960s: External cardiac massage, external cardiac defibrillation, ICUs
- The impact of the space program and the development of equipment to monitor health of astronauts in space



# Impact on Practice

- Implementing new technology and new knowledge results in a shift in responsibilities for nursing and scope of practice. Evolutionary
- Need to quickly adapt to new technologies
- Need to rethink the work
- New knowledge and skills – expanding scope of practice
- New ways to relate to other clinicians
- Emerging of new disciplines with shifting responsibilities (example RT)
- Need to manage the machines and the patients
- Creation of the ICU
- Creation of new roles (clinical specialties, critical care nurses, nurse Informaticist)



# Revolutionary Practice Change

The role of the CCU nurse in the 1960s required the nurse to recognize a potentially fatal arrhythmia, operate the complex equipment to convert the arrhythmia can be translated as diagnosing and defibrillating – actions previously only performed by physicians. Shifted role from care to cure.

Began the blurring of some of the lines between nursing and medicine



# Impact on Patient Care

- Increased acuity and complexity
- Need for new models of care
- Changing expectations of patients
- Need for different physical environments to accommodate new technologies
- Increased expectations for quality



# Evolutionary Patient/Consumer Expectations

- Moved from Physician as source of all health information
- To – patient/consumer as active participant obtaining information from multiple sources



# Revolutionary External Regulation

- Increasing external oversight
  - Joint Commission
  - Quality organizations
  - Third party payers
  - Accrediting agencies
  - Focus on cost management
- Increasing demands for data
- Increasing focus on outcomes
  - Value Based Purchasing
  - Pay for Performance
  - Core Measures



# Information Management

1961 – iRecord

<http://www.youtube.com/watch?v=t-aiKllc6uk>

<http://www.youtube.com/watch?v=t-aiKllc6uk>



# Revolutionary IT



# Information Systems

Paper Foldout  
Flowsheets

DATE:	TIME:	07	08	09	10	11	12	13	14	15	16
1. Temp (ORAXC)	101	101	101	102	100.2				99.8		
2. BP Sys	114	112									
3. Dia	74	60									
4. Art Line Sys	118	100	104	95	114	94	112	10	105		
5. Dia	80	55	60	55	62	55	56	60	64		
6. MAP	81	68							79		
7. Heart Rate	128	124	118	112	106	111	107		112		
8. Rhythm	SI										
9. PA Syst/Dias	31/14			24/17		25/18		30/19	30		
10. PCWP	8/10	8/10		8/10		8		9	8		
11. CVP / RA	8			7		7		7	7		
12. SVR	100			103		100		100	100		
13. CO (L/min)	5.0			4.7		4.7		4.7	4.7		
14. ICP/PP	18	18		18		18		18	18		
15. Pulses: Radial RL	2/2										
16. Dorsalis Pedis RL	2/2										
17. Post. Tibial RL											
18. Breath Sounds: R	CLEAR										
19. L	CLEAR										
20. PFT (Tidal Volume)	1000			1000		1000		1000	1000		
21. Mode: PSV / AG / MV	AG										
22. TV: Spont/Ret	1000			1000		1000		1000	1000		
23. Rate: Total / Spont/Ret	12			12		12		12	12		
24. PEEP / PEEP or CPAP	1			1		1		1	1		
25. Peak Insp. Pressure	40			40		40		40	40		
26. SPO2 (SVO, RPP)	99			99		99		99	99		
27.											
28.											
29.											
30.											
31. ABGs: PO2 / pH	597/50			777/77		797/79		61/75			
32. PCO2 / BE	27/29			29/18		28/25		30/14			
33. Peak Size RL	1										
34. React RL	5										
35. Eyes Open RL	2										
36. Verbal Response	1/5										
37. Motor Response	7										
38. Strength UE RL	2										
39. LF RL	2										
40. Dependent (60/20/60)	38	38	38	38	30	30	24	30	26		
41. Independent (60/20/60)	30	30	30	30	30	30	30	30	30		
42. Leach (lb)	30	20	15								
43. NS	100	100	100	100	100	100	100	100	100		
44. Postural (in 250 AS)	10	10	10	10	10	10	10	10	10		
45. AS / Blough - multi (in AS)	6	4.0	10	10	4.0	10	10	4.0	4.0		
46. AS	10	10	10	10	10	10	10	10	10		
47. Total Hourly IV	214	213	218	210	200	199	230	150	240		
48. Cum IV Total	614	652	1085	1262	1553	1753	1777	2127	2907		
49. Blood Products											
50. P.O. / T.F.											
51. Cum. Total Intake											

## eFlowsheets

Find Item	Critical	High	Low	Abnormal	Unauth	Flag	And	Or
Result	Comments	Flag	Date	Performed By				
10/27/11								
		15:00 - 15:59	14:00 - 14:59	13:00 - 13:59	12:00 - 12:59	11:00 - 11:59		
<b>Vital Signs</b>								
Heart Rate Monitored	bpm	85 [2]	83 [4]	79 [4]	80 [4]	76 [3]		
Heart Rate Apical	bpm							
Pulse Rate Peripheral	bpm							
SBP/DBP Cuff	mmHg	132/65 [2]	157/73 [4] ↑	132/58 [4] ↓	103/56 [4] ↓	102/42 [3]		
Mean Arterial Pressure (cuff)	mmHg	81 [2]	94 [4]	76 [4]	64 [4] ↓	56 [3] ↓		
BP Location							Right arm	
CVP	mmHg							
Respiratory Rate: Actual	/min	34 [2]	25 [4]	21 [4]	33 [4]	11 [3]		
SpO2	%	99 [2]	100 [4]	99 [4]	99 [4]	93 [3]		
SaO2								
Delivery Device (RT)								
Humidification Temperature, Delivered	DegC							
O2 Delivery Method								
O2 Flow Rate								
FI02 Delivered: (RT)								
Temperature Oral (deg C)	DegC			36.8 [3]	36.7 [3]	37.1		
Temperature Oral (deg F)	DegF			98.2 [3]	98.1 [4]	98.8		
Temperature Axillary (deg C)	DegC							
Temperature Axillary (deg F)	DegF							
Temperature Rectal (deg C)	DegC							
Temperature Rectal (deg F)	DegF							
Vital Signs Comment				bld transfusion co...	[3]	bld transfusion co...	[3]	
Assessment Type							Pre Treatment	
<b>Orthostatic Vital Signs</b>								



# Evolutionary Documentation

With the increased use of complex equipment, there was a concurrent increase in the type and amount of data available to the clinicians.

Documentation also became the vehicle through which external agencies began to evaluate quality of care



# Impact of Documentation Changes on Patient Care

- Privacy/patient confidentiality
- Increasing amount of data to integrate
- Too much information to easily manage



# Impact of Documentation on Practice

- New workflows
- New requirements to “prove care provided”
- Never events
- Meeting new expectations from patients, families and other members of the health care team
- New relationships and role expectations



# Trends in Nursing Informatics

- Positions & Competencies for Nurses
- Technology Acceptance & Dependence
- Health Care Delivery & Regulatory Changes



# Revolutionary Trends in Positions & Competencies

- Blurring of roles for nurses & clinical informaticists
- Requires higher level of knowledge & skill
- Shift from specialist knowledge to mainstream
- Role boundaries blur (clinical analyst, informatics executive, database developer)



# Evolutionary Technology Acceptance

- Technology is commonplace
- New models of work & education
- Decreasing skills in face to face communication
- Consumers with greater expectations for accelerated information



# So What Does the Future Hold?



# Health Care Trends that Impact Nursing

- Decreasing Insurance Coverage
- Pressure for Optimal Outcomes
- Alternative Care Methods
- Cost Management Focus
- Competition for Capital Dollars
- New Care Delivery Models
- Transparency & Accountability



# Healthcare Trends that Impact Nursing

- New Care Delivery Models
- Transparency & Accountability
- Continuing Focus on Safety/Quality/Efficiency
- Unifying Standards of Practice
- Preventing Readmissions
- Non-Traditional Partnerships



# IT Pervasiveness



# Revolutionary Leveraging of Technology

- Nanotechnology
- Public Health Monitoring Tools
- Devices & Hardware
- Robotics
- Improved Clinical pictures
- Genomics
- Education
- Patient Access to Health Information



# QUESTIONS?

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