Health economics leadership in a national, collaboration-driven cancer control organization

PRESENTED BY:
Craig C. Earle MD MSc FRCPC
Canadian Partnership Against Cancer

• Funded by the federal government
• Work with partners who deliver health care: provincial and territorial governments, cancer agencies, professional organizations, etc.

➢ Improve the equity, quality, sustainability of the health care system
  • Reporting on system performance
  • Support evidence-based policy and practice change
  • Incubate and spread innovation
OncoSim model

• Microsimulation model
  • Can simulate the entire Canadian population

• Data primarily from Canadian sources; the literature when not available
  • Includes competing risks, economic and taxation data

• Web-based, transparent
  • Can change any parameter
OncoSim Framework

Genetic Risk

RISK FACTORS
Lifestyle
Environment
Presence of virus

SCREENING
Target populations
Participation rates
Various modalities

NEW TREATMENT
Cost
Survival
Healthy utility

OUTCOMES
Cancer incidence
Cancer deaths
Resource needs
Direct health care costs
Life expectancy (LE)
Health-adjusted LE
Economic impacts

Incremental Cost-effectiveness Ratios (ICERs)

CANCER
Incidence
Treatment
Progression
Relapse
Case-fatality

OTHER CAUSE MORTALITY
Examples of Recent Policy Questions Addressed by OncoSim
Cost-Effectiveness of Organized vs Opportunistic Lung Cancer Screening

![Graph showing the cost-effectiveness of different screening strategies](chart.png)

- **CTFPHC:** 55-74, 30 pk yr
- **USPSTF:** 55-80, 30 pk yr
- **Opp:** 55-74, 10 pk yr
- **Opp:** 40-74, 10 pk yr

- Difference in cost (Billions):
  - $0
  - $2
  - $4
  - $6
  - $8
  - $10
  - $12
  - $14

- Gain in quality-adjusted life-years (QALY):
  - $57,100
  - $97,200
  - $125,800

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**Notes:**
- Cost figures are approximate and may vary based on actual implementation.
- Quality-adjusted life-years (QALY) represent the years of life gained with health equivalent to that of a normal life in terms of quality.
Cost-effectiveness of lung cancer screening with and without smoking cessation

*RR=Recruitment Rate; AR=Adherence Rate; SC=Smoking Cessation; SCR=Smoking Cessation Rate; Costs $2016 CAD; 1.5% discount rate applied
Predicted effect of different colon cancer screening approaches
Number of colonoscopies for CRC screening that will be required in Canada, by different FIT thresholds
Economic benefit of FIT compared to gFOBT

* 60% participation; undiscounted costs: gFOBT: guaiac Fecal Occult Blood Test; FIT: fecal immunochemical test
Impact of varying HPV vaccination rates (boys and girls) on cervical cancer incidence
Average annual colposcopies required

![Bar chart](chart.png)

- **60% HPV Vaccination**
  - ASCO: 90,000
  - CTFPHC: 123,000
- **Without Vaccination**
  - ASCO: 125,000
  - CTFPHC: 139,000
Conclusions

• National effort to develop pan-Canadian modelling tool
  • Assess the costs and benefits of various cancer control interventions
  • Flexible and nimble; responsive to emerging issues
  • Benefits for provincial & territorial decision-makers, stakeholders and researchers
  • Optimize the system through improved resource allocation decisions → system sustainability
Thank you

FOR MORE INFORMATION:
Craig Earle
Craig.Earle@partnershipagainstcancer.ca
Partnerships to create sustainable and accessible cancer care

Breast Surgery Guidelines in Low Resource Settings

Cheng-Har Yip

Consultant Breast Surgeon, Ramsay Sime Darby Healthcare
Emeritus Professor University of Malaya
Lead Clinician, Cancer Research Malaysia
Past-President, Breast Surgery International

Track 3 - Improved and sustainable healthcare systems for better outcomes
Challenges in providing standard of care for breast cancer surgery in LMICs

Manpower and training
General surgeons vs breast surgeons
Credentialling
Infrastructure – radiation after breast conserving surgery
Breast reconstruction – is it a luxury poor countries cannot afford?
Opportunities and suggestions to improve optimal care delivery in LMICs

Optimise available resources - surgeons, pathologists, radiologists, anaesthetists, oncologists

Multidisciplinary clinical practice guidelines – stratified to available resources

Situational analyses – need data for planning, number of patients, number of surgeries, mastectomy rate,

Resource stratification
Resource stratification
(Breast Health Global Initiative)

Basic level - core resources absolutely necessary for any breast health programme

Limited level - these are second tier resources or services which would produce a major improvement in outcome

Enhanced level - these third-tier resources or services are optional and may produce minor improvements in survival.

Maximal level - these are high-level resources that may not even be affordable in high-resource countries.

BHGI has had 4 summit meetings which have led to publications on guidelines to breast health in LMICs
### Resource stratified guidelines for locoregional treatment

<table>
<thead>
<tr>
<th>Level of Resource</th>
<th>Surgery</th>
<th>Radiation therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic</td>
<td>Modified radical mastectomy</td>
<td>None</td>
</tr>
<tr>
<td>Limited</td>
<td>Breast conserving surgery (BCS)</td>
<td>Whole breast irradiation as part of BCS</td>
</tr>
<tr>
<td></td>
<td>Sentinel lymph node (SLN) with blue dye</td>
<td></td>
</tr>
<tr>
<td>Enhanced</td>
<td>SLN biopsy using radiotracer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Breast reconstruction surgery</td>
<td></td>
</tr>
<tr>
<td>Maximal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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## Breast cancer surgery checklist

<table>
<thead>
<tr>
<th>Therapy</th>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Required resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified Radical Mastectomy</td>
<td>Rapid treatment</td>
<td>Disfiguring</td>
<td>Staff: surgeon, anesthesiologist, nurses, Resource: Operating theatre</td>
</tr>
<tr>
<td></td>
<td>Curative for early breast cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technology to perform widely available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast Conservation Surgery with axillary dissection</td>
<td>Rapid surgical treatment</td>
<td>Technically demanding</td>
<td>Same as above PLUS radiation oncology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not appropriate for all patients</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Margin status by pathology</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Needs post-op radiotherapy</td>
<td></td>
</tr>
<tr>
<td>Sentinel Lymph Node with blue dye</td>
<td>Accurate identification of SLN</td>
<td>Requires experienced SLN team</td>
<td>Staff: experienced surgeon and pathologist</td>
</tr>
<tr>
<td></td>
<td>Minimize morbidity in women with negative axillary lymph nodes</td>
<td>Rare allergic reaction</td>
<td></td>
</tr>
<tr>
<td>Sentinel Lymph Node with radiotracer</td>
<td>Accurate identification of SLN</td>
<td>Requires experienced SLN team</td>
<td>Same as above PLUS Nuclear medicine facilities</td>
</tr>
<tr>
<td></td>
<td>Minimize morbidity in women with negative axillary lymph nodes</td>
<td>Special handling of radiotracer</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Country *</th>
<th>Access to Radiotherapy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>East Asia</strong></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>36.1%</td>
</tr>
<tr>
<td>North Korea</td>
<td>5.2%</td>
</tr>
<tr>
<td>Mongolia</td>
<td>35.5%</td>
</tr>
<tr>
<td><strong>South East Asia</strong></td>
<td></td>
</tr>
<tr>
<td>Cambodia</td>
<td>4.7%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>8.7%</td>
</tr>
<tr>
<td><strong>Malaysia</strong></td>
<td><strong>78.9%</strong></td>
</tr>
<tr>
<td>Myanmar</td>
<td>7.9%</td>
</tr>
<tr>
<td>Philippines</td>
<td>26.4%</td>
</tr>
<tr>
<td>Thailand</td>
<td>39.6%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>21.3%</td>
</tr>
<tr>
<td><strong>South Asia</strong></td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>36.3%</td>
</tr>
<tr>
<td>Pakistan</td>
<td>21.4%</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>11.2%</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>39.6%</td>
</tr>
<tr>
<td>Nepal</td>
<td>23%</td>
</tr>
</tbody>
</table>

*No data for Maldives, Bhutan, Laos and Timor Leste

ACTION study – Cost of cancer in 8 low and middle income countries in SE Asia

Overall 48% incidence of financial catastrophe (defined as 30% of household income spent on out-of-pocket payment for cancer treatment)

A sub-study on surgically operable cancer showed a financial catastrophe rate of 31% at 3 months

This may imply that surgery costs less than chemotherapy or radiotherapy

Quality of surgery

This will require audit of the local recurrence rate after BCS and post mastectomy.

A report from India stated that the completeness of mastectomy and axillary clearance is questionable. At a tertiary centre in India, almost 40% of patients referred for management following a so-called MRM in the hands of general surgeons at centers of various levels of expertise have to undergo a re-operation for completion mastectomy and/or axillary clearance.

To improve breast cancer outcomes in LMICs, Breast Surgery International aims to develop quality breast cancer care through conducting workshops and courses aimed at general and breast surgeons in these countries.

- Lucknow, India 2016
- Hue, Vietnam 2016
- Kota Baru, Malaysia (with IAES) 2016
- Yangon, Myanmar 2017
- Kota Kinabalu, Malaysia 2017
- Lucknow, India 2018
- Kuching, Malaysia 2018
Conclusion

Surgery is an essential component in the management of breast cancer. In early breast cancer, surgery alone can cure a large proportion of patients. In LMICs, women present with late disease, where surgery can sometimes be only palliative. Hence the priority is to encourage women to present with early staged breast cancer where cure is possible with competent surgery. International surgery groups can form partnerships with Ministry of Health and local surgery associations in LMICs to run workshops and train surgeons in breast surgery.
Cancer Treatment in Nigeria
Creating a National Coordinated Procurement Mechanism to Improve Access to Chemotherapy and Biologics

Dr. David Atuwo
NC-NCCP
FMOH. NIGERIA

World Cancer Congress
Kuala Lumpur, Malaysia
October 2018
Presentation overview

1. Cancer epidemiology and services in Nigeria

2. Chemotherapy access – the challenge

3. Interventions

4. Key achievements, lessons learned and next steps
Nigeria contributes almost 1% of global cancer incidence and mortality. Government is scaling up efforts to reduce the burden of cancer.

- Mortality/ Incidence ratio - 61%
- Top 5 cancers by both incidence and mortality – Breast, Cervix uteri, Prostate, NHL, Liver

Cancer care in Nigeria
- Comprehensive cancer care is provided at 8 semi-autonomous hospitals
- FMoH currently focused on:
  - Implementation of the national cancer control plan (2018-202)

Source: Globocan 2018
Presentation overview

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The challenge: hospitals buying independently fragments volumes leading to delayed supply, high prices and poor quality products

- Uncoordinated and fragmented procurement
  - Delayed supply
  - High prices quoted by suppliers to cater for unscheduled orders
  - Poor quality products from emergency procurements
  - Stock outs
  - Poor patient access
  - Poor patient outcomes
Data from Nigeria hospitals showed effects of uncoordinated procurement including high and varying pricing.

### One product across hospitals

**Price of Docetaxel 80mg (USD)**

- **Hospital Y**: 150 USD
- **Hospital X**: 100 USD

### One product in the same hospital

**Price of Gemcitabine 1000mg at Hospital C (USD)**

- **Brand A**: 50.00 USD
- **Brand B**: 150.00 USD

### Cost of medicines in the Public vs Private sector hospitals

- **Epirubicin 50mg**
  - Private sector hospital: 20 USD
  - Public sector hospital: 40 USD

- **Gemcitabine 1000mg**
  - Private sector hospital: 60 USD
  - Public sector hospital: 80 USD
Presentation overview

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4. Key achievements, lessons learned and next steps
The Nigeria FMoH partnered with CHAI and ACS to systematically address chemotherapy access challenges

<table>
<thead>
<tr>
<th>The Challenges</th>
<th>Addressing the challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fragmented and <strong>unpredictable supply</strong></td>
<td>On the demand side:</td>
</tr>
<tr>
<td>• <strong>High mark ups</strong> throughout the supply chain</td>
<td>• <strong>Select target products</strong> – Essential Medicines List, expert interviews, review procurement data</td>
</tr>
<tr>
<td>• <strong>Variance in pricing and quality</strong></td>
<td>• <strong>Forecast</strong> volumes</td>
</tr>
<tr>
<td></td>
<td>• <strong>Coordinate procurement</strong> across multiple treatment centers</td>
</tr>
<tr>
<td></td>
<td>On the supply side:</td>
</tr>
<tr>
<td></td>
<td>• <strong>Analyze</strong> market prices</td>
</tr>
<tr>
<td></td>
<td>• <strong>Negotiate</strong> with quality manufacturers</td>
</tr>
</tbody>
</table>
Access agreements with Pfizer and Cipla offer potential savings of >50%

16 Quality Approved Chemotherapies

- Anastrozole
- Bleomycin
- Capecitabine
- Carboplatin
- Cisplatin
- Cytarabine
- Docetaxel
- Doxorubicin
- Epirubicin
- Fluorouracil
- Gemcitabine
- Leucovorin
- Methotrexate
- Oxaliplatin
- Paclitaxel
- Vinblastin

Key treatments for breast, cervical, colorectal cancers and Kaposi Sarcoma and some used for pediatric treatments

Current Countries*

- Ethiopia
- Rwanda
- Nigeria
- Tanzania
- Kenya
- Uganda

*Agreements are currently being expanded to cover 18-21 countries in Sub Saharan Africa

*44% of cancer incidence in region
Coordinated procurement across hospitals instituted to reduce cost, improve efficiency and reduce lead times

1. Stakeholder engagement
   - FMoH converged Chief Medical Doctors from 7 hospitals to discuss coordinated procurement

2. Quantification
   - Determined the volumes required by each hospital and included buffer to cater for increased demand due to lowered prices

3. Procurement
   - Coordinated procurement timelines across the hospitals. One national order was placed which would reduce lead time

4. Infrastructural improvement
   - Partnered with a private sector company, EMGE Resources, to improve infrastructure, manage last mile distribution and support inventory and accounting management

5. Regulatory support
   - Worked with HMH Prof. Adewole to obtain a special import permit to allow importation of products into the country.

6. Private sector engagement
   - Inclusion of private sector hospitals into the national procurement
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4. Key achievements, lessons learned and next steps
Nigeria can potentially *save up to $5.4M and enable a shift to top quality products* with the coordinated hospital procurement under the chemotherapy access partnership pricing in the first year.

More people will be able to receive treatment within the same resource envelope.
### Key achievements

- Coordinated quantification and procurement among hospitals for the first time
- Inclusion of private sector hospitals’ requirements

### Lessons learnt

- Coordinated procurement among large institutions is possible with buy-in from leadership
- Adequate time should be set aside for regulatory processes

### Next steps

- Expand the product list – pediatric formulations, additional adult formulations and supportive therapies
- Include biologic therapies
- Include additional hospitals
Questions?